

Col - HQ2548-23 - P007996
23

The Academy of Management



JOURNAL

Articles

Corporate Raiders and Their Disciplinary Role in the Market for Corporate Control

James P. Walsh and Rita D. Kosnik

Organizational Escalation and Exit: Lessons from the Shoreham Nuclear Power Plant

Jerry Ross and Barry M. Staw

Relative Standing: A Framework for Understanding Departures of Acquired Executives

Donald C. Hambrick and Albert A. Cannella, Jr.

Succession as a Sociopolitical Process: Internal Impediments to Outsider Selection

Albert A. Cannella, Jr., and Michael Lubatkin

Strategic Alliance Structuring: A Game Theoretic and Transaction Cost Examination of Interfirm Cooperation

Arvind Parkhe

Research Notes

Effects of Alternate Family Structures on Managerial Career Paths

Joy A. Schner and Frieda Reitman

Top Management Team Size, CEO Dominance, and Firm Performance: The Moderating Roles of Environmental Turbulence and Discretion

Jerayr Haleblian and Sydney Finkelstein

Ghosts of Managers Past: Managerial Succession and Organizational Mortality

Heather A. Haveman

Fair Pay for Fair Play: Estimating Pay Equity in Professional Baseball with Data Envelopment Analysis

Larry W. Howard and Janis L. Miller

An Assessment of the Construct Validity of Three Job Evaluation Methods: A Field Experiment

Judith M. Collins and Paul M. Muchinsky

ACADEMY OF MANAGEMENT

BOARD OF GOVERNORS

PRESIDENT	Donald C. Hambrick, Columbia University
PRESIDENT-ELECT & COORDINATOR OF PROFESSIONAL DIVISIONS	Greg R. Oldham, University of Illinois, Urbana-Champaign
VICE PRESIDENT & PROGRAM CHAIRPERSON	Mary Ann Von Glinow, University of Southern California
SECRETARY-TREASURER & BUSINESS MANAGER	Ken Cooper, Ohio Northern University
PAST PRESIDENT	Ramon J. Aldag, University of Wisconsin, Madison
EDITOR, ACADEMY OF MANAGEMENT EXECUTIVE	John F. (Jack) Veiga, University of Connecticut
EDITOR, ACADEMY OF MANAGEMENT JOURNAL	Michael A. Hitt, Texas A&M University
EDITOR, ACADEMY OF MANAGEMENT REVIEW	Richard J. Klimoski, Ohio State University
REPRESENTATIVES-AT-LARGE	Allen C. Bluedorn, University of Missouri
	Janet Fulk, University of Southern California
	David B. Jemison, University of Texas, Austin
	Joanne Martin, Stanford University
	Janet P. Near, Indiana University
	William H. Starbuck, New York University
	Anne Tsui, University of California at Irvine
CHAIRPERSONS OF PROFESSIONAL DIVISIONS	
BUSINESS POLICY & STRATEGY	Kathryn Rudie Harrigan, Columbia University
CAREERS	Daniel C. Feldman, University of South Carolina
CONFLICT MANAGEMENT	James A. Wall, Jr., University of Missouri
ENTREPRENEURSHIP	Elizabeth Gatewood, University of Houston
HEALTH CARE ADMINISTRATION	Grant T. Savage, Texas Tech University
HUMAN RESOURCES	Dianna L. Stone, State University of New York at Albany
INTERNATIONAL MANAGEMENT	Merk Mendenhall, University of Tennessee at Chattanooga
MANAGEMENT EDUCATION & DEVELOPMENT	Patricia Sanders, Central Connecticut State University
MANAGEMENT HISTORY	Robert C. Ford, University of Alabama at Birmingham
MANAGERIAL CONSULTATION	Eugene G. Gomolka, Gomolka & Associates
ORGANIZATION & MANAGEMENT THEORY	Ray Zammuto, University of Colorado
ORGANIZATION DEVELOPMENT & CHANGE	Luke Novelli, Jr., Center for Creative Leadership
ORGANIZATIONAL BEHAVIOR	Ricky W. Griffin, Texas A&M University
ORGANIZATIONAL COMMUNICATION & INFORMATION SYSTEMS	Tim O. Peterson, University of Tulsa
PRODUCTION/OPERATIONS MANAGEMENT	Dan Reid, University of New Hampshire
PUBLIC SECTOR	Barton Wechsler, Florida State University
RESEARCH METHODS	Larry Williams, Purdue University
SOCIAL ISSUES IN MANAGEMENT	Philip L. Cochran, Pennsylvania State University
TECHNOLOGY & INNOVATION MANAGEMENT	Warren B. Brown, University of Oregon
WOMEN IN MANAGEMENT	Stella M. Nkomo, University of North Carolina

CHAIRPERSON OF THE PROFESSIONAL INTEREST GROUP

MANAGERIAL & ORGANIZATIONAL COGNITION Anne Huff, University of Illinois, Urbana-Champaign

OTHER OPERATIONS

ACADEMY HISTORIAN & ARCHIVIST	Charles D. Wrege, Cornell University
ACADEMY NEWSLETTER	Bernard Keys, Georgia Southern University
ADVERTISING DIRECTOR	Donna L. Wiley, California State University, Hayward
PROCEEDINGS	Dorothy Perrin Moore, The Citadel
DIRECTOR OF COMPUTER SERVICES	Lee G. Caldwell, Novell, Inc.
DIRECTOR OF INTERNATIONAL PROGRAMS	Carolyn R. Dexter, Pennsylvania State University, Harrisburg
DIRECTOR OF MEMBERSHIP	Lucretia Coleman, Georgia College
DIRECTOR OF MEDIA RELATIONS	Barbara Parker, Seattle University
DIRECTOR OF PLACEMENT	McRae C. Banks, Mississippi State University
DIRECTOR OF PUBLISHER RELATIONS	Kenneth R. Thompson, DePaul University
SIGMA IOTA EPSILON, DIRECTOR	
STUDENT DIVISION	R. I. Hodge, Florida State University

Academy of Management JOURNAL

658.05
Ac 12

EDITOR
ASSOCIATE EDITOR
CONSULTING EDITORS

Michael A. Hitt, Texas A&M University
Angelo S. DeNisi, Rutgers University
Susan J. Ashford, University of Michigan
Jane E. Dutton, University of Michigan
Alan D. Meyer, University of Oregon

EDITORIAL BOARD

Everett E. Adam, Jr., University of Missouri, Columbia
Phillip Anderson, Cornell University
David B. Balkin, University of Colorado
Jean M. Bartunek, Boston College
Thomas S. Bateman, University of North Carolina
Philip Bobko, Rutgers University
Warren Boeker, Columbia University
Philip Bromiley, University of Minnesota
Jennifer A. Chatman, Northwestern University
Edward J. Conlon, University of Notre Dame
David A. Cowan, Miami University
Richard A. D'Aveni, Dartmouth College
Gregory G. Dess, University of Texas, Arlington
Robert Drazin, Emory University
Janet M. Dukerich, University of Texas
P. Christopher Earley, University of California at Irvine
Kathleen M. Eisenhardt, Stanford University
John E. Ettilie, University of Michigan
Gerald R. Ferris, University of Illinois at Urbana-Champaign
Sydney Finkelstein, University of Southern California
Howard Garland, University of Delaware
Connie J. G. Gersick, University of California at Los Angeles
Jennifer M. George, Texas A&M University
Luis Gomez-Mejia, Arizona State University
Ricky W. Griffin, Texas A&M University
Barbara A. Gutek, University of Arizona
Charles W. L. Hill, University of Washington
John R. Hollenbeck, Michigan State University
Robert E. Hoskisson, Texas A&M University
Barbara W. Keats, Arizona State University
Steven J. Kobrin, University of Pennsylvania
Rita D. Kosnik, Trinity University
Barbara S. Lawrence, University of California at Los Angeles
Thomas W. Lee, University of Washington
Alfred A. Marcus, University of Minnesota
Frances J. Milliken, New York University
Debra L. Nelson, Oklahoma State University
Gregory B. Northcraft, University of Arizona
Richard Osborn, Wayne State University
Sara L. Rynes, University of Iowa
Vida Scarpello, Georgia State University
Claudia B. Schoonhoven, San Jose State University
David M. Schweiger, University of South Carolina
Peter Sherer, University of Pennsylvania
Stephen M. Shortell, Northwestern University
Ken G. Smith, University of Maryland
Linda K. Trevino, Pennsylvania State University
Anne S. Tsui, University of California at Irvine
James P. Walsh, University of Michigan
Stuart A. Youngblood, Texas Christian University
Ken Cooper, Ohio Northern University
Donna Wiley, California State University, Hayward
Persephone Doliner, Ithaca, New York
Margaret A. White, Oklahoma State University
Steven Gomes, Mahopac, New York

BUSINESS MANAGER
ADVERTISING DIRECTOR
COPY EDITOR
INDEX EDITOR
PRODUCTION EDITOR

23

INFORMATION FOR CONTRIBUTORS

The *Academy of Management Journal* publishes articles in fields of interest to members of the Academy of Management. These fields of interest are reflected in the divisions and interest groups listed on the inside front cover of the *Journal*.

AMJ publishes only original, empirical research as articles or research notes. The *Journal* does not publish purely theoretical articles; these are published by the *Academy of Management Review*. Papers that are primarily applied in focus and that have managers as an intended audience should be submitted to the *Academy of Management Executive*.

In its articles, the *Journal* seeks to publish research that develops, tests, or advances management theory and practice. Articles should have a well-articulated and strong theoretical foundation. All types of empirical methods—quantitative, qualitative, or combinations—are acceptable. Exploratory survey research lacking a strong theoretical foundation, methodological studies, replications or extensions of past research, and commentaries with new empirical content are also of interest for publication as research notes if they make an important contribution to knowledge relevant to management.

Articles and research notes should be written so they are understandable and interesting to all members of the Academy. The contributions of specialized research to general management theory and practice should be made evident. Specialized argot and jargon should be translated into terminology in general use within the fields of management. Articles should also be written as concisely as possible without sacrificing meaningfulness or clarity of presentation. To save space, tables should be combined and data should be presented in the text wherever possible.

Manuscripts submitted for publication as articles should not ordinarily exceed 30 double-spaced typewritten pages, including tables. Manuscripts submitted as research notes should not exceed 15 double-spaced typewritten pages, including tables. Everything in submitted manuscripts, including tables, should be typed in double-spaced format on one side of the page. Manuscripts prepared on computers should be printed on letter-quality printers or, if other printers are used, in double-strike or enhanced print.

Manuscripts are considered for publication with the understanding that their contents have not been published and are not under consideration elsewhere. Manuscripts should be prepared in accordance with the AMJ "Style Guide for Authors," which is published in the February issue and is also available from the editor. Contributors should submit five copies of their papers, retaining the original for their files. The *Journal* does not return manuscripts unless requested to do so.

Decisions regarding publication of submitted manuscripts are based on the recommendation of members of the Editorial Board or other qualified reviewers. All articles and research notes published in the *Journal* are subject to a blind review process. Obvious self-citations that make known the author's identity should be avoided whenever possible. Reviewers evaluate manuscripts on their significance to the field, conceptual adequacy, technical adequacy, appropriateness of content, and clarity of presentation. Reviewers' comments are made available to authors.

Submissions should be sent to Professor Michael A. Hitt, *Academy of Management Journal*, College of Business Administration, Texas A&M University, College Station, Texas 77843-4221.

Academy of Management JOURNAL

CONTENTS

Volume 36, Number 4, August 1993

From the Editor..... 669

Corporate Raiders and Their Disciplinary Role in the Market for
Corporate Control

James P. Walsh and Rita D. Kosnik 671

Organizational Escalation and Exit: Lessons from the Shoreham Nuclear
Power Plant

Jerry Ross and Barry M. Staw..... 701

Relative Standing: A Framework for Understanding Departures of
Acquired Executives

Donald C. Hambrick and Albert A. Cannella, Jr. 733

Succession as a Sociopolitical Process: Internal Impediments to
Outsider Selection

Albert A. Cannella, Jr., and Michael Lubatkin..... 763

Strategic Alliance Structuring: A Game Theoretic and Transaction Cost
Examination of Interfirm Cooperation

Arvind Parkhe 794

RESEARCH NOTES

Effects of Alternate Family Structures on Managerial Career Paths

Joy A. Schneer and Frieda Reitman 830

Top Management Team Size, CEO Dominance, and Firm Performance:
The Moderating Roles of Environmental Turbulence and Discretion

Jerayr Haleblian and Sydney Finkelstein 844

Ghosts of Managers Past: Managerial Succession and
Organizational Mortality

Heather A. Haveman 864

Fair Pay for Fair Play: Estimating Pay Equity in Professional Baseball with Data Envelopment Analysis

Larry W. Howard and Janis L. Miller 882

An Assessment of the Construct Validity of Three Job Evaluation

Methods: A Field Experiment

Judith M. Collins and Paul M. Muchinsky 895

Special Research Forum Calls for Papers 905

NEW SUBMISSIONS

New submissions to the *AMJ* should be sent to:

Angelo S. DeNisi, Associate Editor
Academy of Management Journal
Institute for Management and Industrial Relations
Rockefeller Road—Kilmer Campus
Rutgers University
New Brunswick, NJ 08903-5062

Michael A. Hitt will continue to handle papers under revision through December 1993.

The *Academy of Management Journal* (ISSN 0001-4273) is published by the Academy of Management six times a year in February, April, June, August, October, and December. The address of the office of publication is Academy of Management, Ohio Northern University, P.O. Box 209, 300 South Union St., Ada, OH 45810.

Subscription rates for *AMJ* only: in U.S., Mexico, and Canada, \$65 for one year, \$123.50 for two years, \$175.50 for three years. Rates for overseas: \$75 for one year, \$142.50 for two years, \$213.75 for three years. All payable in U.S. dollars. Subscriptions and orders for back issues should be sent to the Business Manager, Ken Cooper, Ohio Northern University, P.O. Box 209, 300 South Union St., Ada, OH 45810. For membership information, call the Academy of Management business office, (419) 772-1953, fax (419) 772-1954.

Manuscripts and other material of an editorial nature should be sent to Angelo S. DeNisi, *Academy of Management Journal*, Institute for Management and Industrial Relations, Rockefeller Road—Kilmer Campus, Rutgers University, New Brunswick, NJ 08903-5062.

Copies of articles published in the *Journal* may be made for instructional, noncommercial use. The Academy of Management does not require prior clearance and makes no charge for this permission.

Inquiries related to advertising should be addressed to Donna Wiley, California State University, Department of Management and Finance, Hayward, CA 94542-3069, (415) 881-3984.

Printed in the United States. Typesetting, presswork, binding, and mailing by The Sheridan Press, Hanover, PA.

Academy of Management Journal, Publication No. 900920.

Second class postage paid at Ada, OH, and additional mailing offices.

POSTMASTER—Send address changes to *Academy of Management Journal*, Ohio Northern University, P.O. Box 209, 300 South Union St., Ada, OH 45810.

ISSN, 0001-4273

FROM THE EDITOR

We are currently in the transition phase between editorships. Therefore, as has been announced in several issues of *AMJ*, all new manuscripts are to be submitted to the Associate Editor and Editor Designate, Angelo DeNisi. All revised manuscripts should continue to be submitted to me until December 31, 1993.

Also, I want to call your attention to the Calls for Papers for the Special Research Forums, (1) Innovative Approaches to Intercultural/International Management Research and (2) Intra- and Interorganizational Cooperation and Coordination, that are again published herein. The deadline for submission of manuscripts for these Special Research Forums is September 1, 1993. Therefore, the deadline is drawing close. If you have work that fits one of these forums, and is at an appropriate stage, I encourage you to submit a manuscript to be reviewed for publication in *AMJ*. Our goal is to publish these forums in the December 1994 issue.

We hope that you continue to consider the *Academy of Management Journal* as a primary outlet for your scholarly empirical research in management and that you continue to utilize and read *AMJ* as a medium for cutting-edge research in our field.

Michael A. Hitt

PAST EDITORS

Paul M. Dauten, Jr., <i>University of Illinois</i>	1958–60
Dalton E. McFarland, <i>Michigan State University</i>	1961–63
Paul J. Gordon, <i>Indiana University</i>	1964–66
Stanley C. Vance, <i>University of Oregon</i>	1967–69
William G. Scott, <i>University of Washington</i>	1970–72
John B. Miner, <i>Georgia State University</i>	1973–75
Larry L. Cummings, <i>University of Wisconsin–Madison</i>	1976–78
John W. Slocum, Jr., <i>Southern Methodist University</i>	1979–81
Thomas A. Mahoney, <i>Vanderbilt University</i>	1982–84
Janice M. Beyer, <i>New York University</i>	1985–87
Richard T. Mowday, <i>University of Oregon</i>	1988–90

CORPORATE RAIDERS AND THEIR DISCIPLINARY ROLE IN THE MARKET FOR CORPORATE CONTROL

JAMES P. WALSH
University of Michigan

RITA D. KOSNIK
Trinity University

Little research examines the supposed disciplinary effect of the market for corporate control on entrenched and ineffective management teams. Our analysis of the relationships between firm performance and both officer and director turnover in three groups of companies—those targeted by corporate raiders, their nearest competitors, and a control group—provided little support for this hypothesized discipline. There was only evidence of market discipline among target firms and competitors with sustained histories of poor performance. Interestingly, takeover activity affected both the firms' officers and directors. We examine the implications of these results for our understanding of corporate control processes in particular and agency theory in general.

The past 20 years have been witness to the century's fourth wave of mergers and acquisitions (Golbe & White, 1988). This activity has been associated with, if not blamed for, major upheaval in the structures of industries, financial markets, and firms' corporate strategies. Moreover, there is increasing research evidence to suggest that changes in corporate control through takeovers are followed by above-normal levels of turnover among target firm executives (Furtado & Karan, 1990; Martin & McConnell, 1991; Walsh, 1988). These findings tentatively support a claim popular in the corporate world, that the top executives of target firms are the true victims of the recent wave of "bust-up," or hostile, takeovers (Bennett, 1986).

The results of these cited studies would come as no surprise to such professional investors as Carl Icahn and T. Boone Pickens; they have eagerly acknowledged that the replacement of entrenched and ineffective managers was a primary motive for their raids on corporations (Icahn, 1988; Pickens, 1986), answering the criticism that takeovers put people out of work by pointing out that their actions are a necessary treatment for a disease that is

We would like to thank Joan Goldstein and Kay Romeyn for their help in collecting these data; Dot Bower and John Roback for their computer programming assistance; the reviewers for their comments on the previous version of this article; and the Tuck Associates Program at Dartmouth College for its financial support in the early stages of this research project.

destroying American productivity: gross and widespread management incompetence. In Icahn's words: "The difference is that I and other raiders usually eliminate people who are most responsible for the mess—the Top Brass" (Icahn, 1988).

In financial-economic circles, many see the actions of raiders and other investors who launch hostile takeover bids as natural forces in a market for corporate control where alternative management teams compete for the right to control the assets of undervalued corporations (Jensen & Ruback, 1983). This interpretation is grounded in agency theory, which defines a corporation as a nexus of contracts and assumes that the relationship between professional corporate managers and stockholders is inherently imbued with conflicts of interest about risk orientations, time horizons, effort levels, and the payout of free cash flow (Jensen, 1986). For instance, to the extent that top managers own little or no equity in their firm, they are expected to engage in excessive perquisite consumption, favor low-risk, short-term investments, and pursue the unconditional growth of their empires in pursuit of job security and higher compensation and status (Jensen & Smith, 1985). The inefficiencies resulting from such managerial opportunism are costly to stockholders, as they are thought to depress the market values of firms. Takeovers are seen as a disciplinary mechanism for management teams who engage in opportunistic and ineffective behavior: the change in control that follows a takeover theoretically allows the acquirer to replace managers who failed to serve the stockholders' interests with managers who promise better value (Varian, 1988).

It is generally acknowledged that mergers and acquisitions can fulfill several strategic objectives, including creating synergies, ensuring financial and tax advantages, and establishing market power (Jensen & Ruback, 1983; Ravenscraft, 1987). However, in both academic and practitioner circles, management failings and efficiency improvements have been given great prominence as being, respectively, a core motivation for and an essential consequence of takeovers in the eighties (Herman & Lowenstein, 1988). Jensen (1986) championed this view, defining the role of takeovers as mainly controlling the non-value-maximizing behavior of corporate managers. Even the Council of Economic Advisers' (1985) *Annual Report* concluded that since managers may be poor agents for their stockholders, mergers could improve efficiency by transferring scarce resources to higher-value uses and by stimulating effective corporate management.

Surprisingly, there is little direct evidence for this efficiency-enhancing, disciplinary view of takeovers. Most advocates of this theory base their claims on the well-documented observation that takeovers yield, on average, considerable gains for the target firms' shareholders. For instance, shareholders of acquired companies earned average premiums of 19 percent in the 1960s, 35 percent in the 1970s, and 30 percent between 1980 and 1985 (Jarrell, Brickley, & Netter, 1988). But evidence of a direct link between target firms' inefficiency and positive wealth effects for their stockholders is generally absent from the literature. Unable to otherwise explain the wealth

effects associated with takeover activity, economists have embraced the inefficient management theory as an all-encompassing explanation, despite the absence of causal evidence. According to Ravenscraft (1987), researchers have drawn support for the inefficient management motive by eliminating alternative merger motives.

Indirect tests of the inefficiency theory of takeovers can be found in recent research that examines the relationship between the preacquisition performance of target firms and postacquisition turnover among target firms' executives. To the extent that a hostile takeover serves a disciplinary role for ineffective managers, a poorly performing target company should experience above-average top management turnover after the takeover. Research findings, however, are mixed. In a study of 102 acquired firms, Walsh and Ellwood (1991) found no association between targets' preacquisition performance and postacquisition top management turnover. Martin and McConnell (1991) studied 253 tender offers made between 1958 and 1984 and found that target firms marked by above-normal postacquisition executive turnover had performed significantly worse than their competitors. However, they found no significant differences in preacquisition performance between (1) targets with increased postacquisition turnover and the market in general and (2) the targets of hostile rather than friendly takeovers. A plausible explanation for these inconclusive findings is that the authors confounded a variety of merger motives in their work by sampling firms from a wide array of mergers and acquisitions. Clearly, the disciplining of entrenched and ineffective management teams may constitute only one of many reasons for a takeover.

The purpose of this study was to more rigorously test the discipline motive in takeover activity; we tested the effect induced by corporate raiders in their overt attempts to challenge the control position of incumbent managers. Raiders' hostile pursuits of corporations are particularly useful for testing the disciplinary role of the market for corporate control since raiders explicitly adhere to the efficiency argument for justifying their raids on companies and their management teams. Therefore, the raiders' pursuit of corporate control positions may best represent the disciplinary role of the market for corporate control.

Three broad questions drove our research. The first concerns raiders' alleged ability to identify and discipline inefficient and entrenched managers through the raiders' participation in the market for corporate control. Holderness and Sheehan (1985) found that stock market investors reacted favorably to the announcement of stock purchases made by raiders. According to those authors, the expectation that the raiders' involvement would lead to improved management drove the market reaction. We tested this interpretation by examining target management turnover after raiders' control challenges. The second research question pertains to the disciplinary effect raiders may exert on targets' boards of directors. So far, the disciplinary role of takeovers has been seen as relevant only to top executives. However, managerial inefficiency and entrenchment can only exist to the extent

that a firm's board of directors tolerates it (Kosnik, 1987). Hence, if hostile takeovers aim to turn around inefficient companies and dismiss those responsible for their poor performance, the targets' board members ought to be disciplined as well (Walsh & Seward, 1990). The third research question concerns the diffusion of the raiders' alleged disciplinary effect within industries. The proliferation of hostile takeovers, regardless of a firm's size, scale, and industry, presents its remaining competitors with a threat to their own independence (Coffee, 1988). We thus examined the extent to which raiders' activity initiated second-order disciplinary actions within the target firms' industries. Specifically, we investigated turnover rates among the top executives and directors of target firm competitors.

OFFICER AND DIRECTOR TURNOVER AS DISCIPLINE

The need to monitor and discipline corporate executives is inherent in the structure of the modern corporation, which is characterized by a separation of ownership and decision making (Fama & Jensen, 1983). Because of the diffusion of corporate ownership and unlimited transferability of ownership rights, control over corporate asset utilization has been delegated to professional managers, whose ownership interest in firms is typically small or nonexistent (Berle & Means, 1932). Stockholders bear the residual risk of managements' resource allocation and investment decisions; the consequences of those decisions for executives' own wealth is only proportional to their equity interests in their firms (Jensen & Meckling, 1976). Herein lies the root of a classic agency problem involving managers and stockholders: they are likely to have divergent interests and goals. Managers may use corporate assets to pursue their personal interests at the cost of their stockholders' wealth (Fama & Jensen, 1983; Jensen & Meckling, 1976).

Given the smallness of the average stockholder's equity position and the large number of stockholders in a given firm, it is both impractical and inefficient for individual stockholders to monitor managers' performance and ensure their compliance with stockholders' interests (Amihud & Lev, 1981). Instead, stockholders rely on either internal, organization-specific control mechanisms or external market forces to monitor and discipline managerial performance.

Internal Management Control

A firm's stockholders delegate the right to monitor and discipline corporate managers to its board of directors. Board members are the formal guardians of the stockholders' interests. It is their task to oversee and ratify management's decisions and to evaluate, reward, and penalize top management's performance (Bacon & Brown, 1975). The board is responsible for the hiring and firing of top executives. In addition, other senior and middle managers may monitor top management's performance by competing for the top executives' positions in the organization's internal labor market (Fama, 1980).

The effective functioning of the internal control mechanisms would imply that top managers are likely to be terminated after a period of poor performance. Indeed, empirical research has found a negative relationship between firm performance and top manager turnover, absent changes in control: executive turnover has been found to be more likely as corporate performance falls (Coughlan & Schmidt, 1985; Shleifer & Vishny, 1988; Warner, Watts, & Wruck, 1988; Weisbach, 1988). Managers are also more likely to be dismissed when firms approach or go through bankruptcy (Furtado & Karan, 1990; Gilson, 1989). This evidence is consistent with the internal discipline argument, according to which boards penalize managers for poor performance. However, the magnitude of these relationships in the cited studies is not strong. There is ample anecdotal and systematic evidence that boards often fail to execute their monitoring role and thus tolerate inefficient and self-serving managerial behavior (Lorsch & MacIver, 1989; Mace, 1971; Weisbach, 1988). Indeed, recent evidence suggests that even when directors do act to remove a chief executive officer (CEO), insider-dominated boards are very reluctant to hire a potentially disruptive CEO from outside a company (Boeker & Goodstein, 1993). A board may remain passive or embrace the status quo because its members lack adequate knowledge or information with which to accurately assess executive performance, because a firm's CEO and inside directors dominate it, or because its members' main interest is to promote contractual or social relations with the firm's executives or fellow directors (Herman, 1981; Kosnik, 1987, 1990; Walsh & Seward, 1990). In such cases, the directors themselves may need to be monitored and controlled. When internal corporate governance fails, external forces for managerial control and discipline become critical.

External Management Control

The takeover market serves as a court of last resort when a corporation's internal controls become inefficient or incapacitated (Fama, 1980). Because managerial inefficiency typically causes a fall in a firm's market value, the firm becomes a target for control contests in which alternative management teams, who recognize an opportunity to reorganize or redeploy the organization's assets and hence to create new value, bid for the rights to manage the corporation's resources.

The concept of takeovers as a disciplinary and efficiency-enhancing mechanism is rooted in Manne's (1965) principle that the stock market is the only objective standard of managerial performance. If markets are efficient, the primary incentive for most takeover attempts is to exploit the difference between a firm's market value and its anticipated market value under effective management (Coffee, 1988; Easterbrook & Fischel, 1981; Jensen & Ruback, 1983). The market for corporate control provides stockholders with "power and protection commensurate with their interest in corporate affairs" (Manne, 1965: 112). The threat of a takeover "limits management's divergence from shareholder wealth maximization and provides the mechanism through which economies of scale or other synergies available from

combining or reorganizing control and management of corporate resources are realized" (Jensen & Ruback, 1983: 6).

Preliminary evidence is equivocal about this disciplinary role of takeovers. Several studies have reported performance problems among companies that were targeted for takeover attempts (Asquith, 1983; Bartley & Boardman, 1986; Hasbrouck, 1985). This observation is consistent with the claim that the takeover market systematically identifies inefficiently run companies in order to find new value for them (Jarrell & Poulsen, 1987). Morck, Shleifer, and Vishny (1989), for instance, found that *Fortune* 500 firms that were targets of hostile takeovers had grown more slowly than other *Fortune* firms before the takeover attempts and had lower Tobin's Q-ratios.¹

Manne argued, however, a possible proof of the disciplining role of takeovers is whether "actual changes in the management personnel ultimately follow the merger" (1965: 120). As was noted, research has shown that top executive turnover after takeovers is indeed significantly higher than the normal turnover rate. However, there is little direct evidence to suggest that the increased postacquisition turnover among target firms' executives is due to the pruning of managerial deadwood, the dismissal of entrenched target managers by acquirers. In our test of the theory of the market for corporate control, we tried to increase the interpretability of past empirical findings by focusing exclusively on the espoused disciplinary actions of corporate raiders.

HYPOTHESES

In the last decade, a new breed of entrepreneur has appeared in the market for corporate control—entrepreneurs who essentially arbitrate the difference between a firm's market value and its liquidation or potential value (*Business Week*, 1985b; Coffee, 1988). These "raiders" are known to routinely challenge the management teams of undervalued companies (Holderness & Sheehan, 1985) by acquiring a stake in their equity, either through small incremental purchases in the open market or through one or more of their affiliated companies. The raiders often use their minority positions to scrutinize a company's management's performance in annual meetings; they use the media to initiate disapproval campaigns among the other stockholders by issuing detracting and impeaching statements; they solicit stockholders' formal support to displace the company's management in proxy fights; they seek representation on its board of directors; or they threaten to take over the company in a hostile takeover.

The true motives of raiders' actions were the topic of intense debate in

¹ Tobin's Q equals the ratio of a firm's market value to the replacement cost of its physical assets. Tobin's Q is high when the firm has valuable intangible assets in addition to physical capital, such as monopoly power, goodwill, a stock of patents, or good managers (Morck, Shleifer, & Vishny, 1988b).

the eighties (Law, 1986; Pickens, 1986). Economically, the motives of raiders are "entirely orthodox" (Coffee, 1988: 116); they are pursuing a profit opportunity that is not available to ordinary shareholders who lack the financial and legal support of a network of individuals and financial institutions that the raiders can assemble. The raiders' ability to force management to liquidate a company whose liquidation value exceeds its going-concern value (Coffee, 1988: 116) allows them to justify their actions in terms of disciplining (eliminating) ineffective and entrenched management teams and forcing managerial accountability toward stockholders (*Business Week*, 1985a; Icahn, 1988; Pickens, 1986).

Regardless of the raiders' effectiveness in accomplishing their proclaimed goals, the mere presence of a raider among a company's stockholders elicits overt reactions among stock market participants, as Holderness and Sheehan (1985) illustrated. Even in the absence of objective information on the performance and character of a target firm's management, the raiders' widespread reputations as "opportunity hunters" (*Business Week*, 1985b; *Fortune*, 1985) and "racketeers" (Reich, 1982), as well as the publicity surrounding their actions, publicly mark the targeted company as possibly undervalued and mismanaged.

Disciplining Top Managers

The raiders' self-acclaimed and popular image as guardians of stockholders' interests, however, rests on the assumption that they can correctly identify inefficient, entrenched management teams. Signs of managerial opportunism and incompetence can be found in top management's expenditures for perks and personal benefits, in the riskiness of their investment and acquisition decisions, and in the time horizons used in their strategic decisions (Jensen & Smith, 1985). Although it is a core premise of agency theory that prolonged managerial inefficiency will ultimately have a negative effect on firm performance, it is difficult to isolate the role of management in firm performance when a variety of financial, economic, and strategic factors determine that performance. Moreover, management failings could be reflected in their inability to bring a firm to its full performance potential, a failure that cannot be judged from financial performance ratios.

Although top management discipline might include rewriting incentive contracts or reorienting a firm's strategic direction, the discipline embodied by top management turnover has received the most attention in business and academic circles. Termination is the most severe takeover consequence for incumbent managers. Research results that chronicle increased postacquisition turnover rates among target firms' top managers lend credence to this threat (Martin & McConnell, 1991; Walsh & Ellwood, 1991). Of course, an examination of relative turnover rates among target firm top managers can provide a test of the disciplinary effect of raiders' control challenges. To the extent that a raider's interest in a firm is driven by the motive of turning around a poorly managed firm and disciplining its entrenched top management, the raider's control position in the firm's equity should initiate in-

creased turnover among its top executives. Furthermore, the size of the performance gap before the raider's appearance should be tied to the extent of such disciplinary actions: The more problematic the performance of a target firm prior to a raider's purchase of an ownership stake, the higher the post-purchase turnover.

Hypothesis 1a: Top management turnover in companies that are challenged by raiders will be higher than the companies' historical turnover rates and higher than the normal rate of top management turnover in comparable companies.

Hypothesis 1b: The increase in top management turnover in companies that are challenged by raiders will be higher in those with poor preraider performance than in those with high preraider performance.

Disciplining Boards of Directors

When a company's top managers fail to perform in accordance with their stockholders' interests, the board of directors bears the ultimate responsibility for this negligence. As the legal representative of stockholders, board members are charged with the duties of due care and loyalty to stockholders. These duties require them to actively promote and protect stockholders' interests with diligence, care, and skill and without self-indulgence (Bacon & Brown, 1975). Hence, boards that allow top managers to engage in behavior that is detrimental to the firm's performance and, ultimately, to the stockholders' wealth fail to perform their fiduciary duties. There is ample anecdotal evidence illustrating that companies whose performance is troubled by the behavior of their entrenched top executives may also have passive, ill-functioning boards (e.g., *Business Week*, 1987a, 1987b, 1989). Systematic evidence that speaks to the ubiquity of this phenomenon, however, is lacking. Nevertheless, many observers of board behavior over the last 25 years have concluded that directors can be more beholden to their CEOs than to their firm's shareholders (Brudney, 1982; Herman, 1981; Lorsch & McIver, 1989; Mace, 1971; Wolfson, 1984).

Although financial economists and organization theorists have extensively discussed the disciplinary effect of hostile takeovers on target firms' ineffective top executives, directors have never been considered as being subject to the same discipline (Walsh & Seward, 1990). Boeker and Goodstein's (1991) study of hospitals suggested that poor performance plays a role in the restructuring of boards of directors; however, no systematic evidence addresses the extent to which targets' boards are restructured as a result of external control contests. To the extent that hostile takeovers and control contests by raiders are indeed driven by motives of increasing performance by eliminating sources of inefficiency, postacquisition restructuring decisions should also implicate the targets' boards, who failed to govern top management's performance effectively in the first place. Low preacquisition

performance should reinforce the need to discipline a firm's management and board. Therefore,

Hypothesis 2a: Turnover among the directors of companies that are challenged by raiders will be higher than the companies' historical turnover rates and will be higher than the normal rate of director turnover in comparable companies.

Hypothesis 2b: The increase in director turnover in companies that are challenged by raiders will be higher in those with poor preraider performance than in those with high preraider performance.

The Diffusion of Takeover Market Discipline

Although many mechanisms that reinforce managerial accountability toward stockholders tend to focus their disciplinary effect at specific moments, such as annual meetings and proxy contests, the threat of discipline exerted by the market for corporate control is constant (Coffee, 1988). The market for corporate control in the 1980s was largely complete. That is, the ready availability of junk bond financing ensured that any company, regardless of its size or scale, was vulnerable to the threat of an unsolicited takeover bid. According to Coffee, "The regime of the takeover is analogous to a political system in which the president could be forced to stand for election at any time and recurrently at the decision of any opposing party" (1988: 102).

Almost any company is vulnerable to becoming a target in the market for corporate control; the threat becomes very real, however, for companies in the same industry as an already targeted company. Economic and industry factors may interact with managerial inefficiency to produce the undervaluation of companies' assets in an entire industry. The recent history of the oil industry offers a classic example. Falling oil prices, combined with oil executives' reputed tendency toward empire building, made oil companies attractive targets for hostile takeovers (Coffee, 1988). Indeed, Morck, Shleifer, and Vishny (1988a) found that poor industry performance raised the odds of hostile takeovers. A raider's pursuit of a company's control, then, threatens the company's competitors. As a consequence, competitors are likely to engage in actions aimed at preventing this control challenge to their own firms. A raider's appearance in an industry is therefore likely to trigger the diffusion of disciplinary actions among the target's competitors as they proactively reorganize and eliminate sources of inefficiency in order to thwart a potential control challenge.

Hypothesis 3a: Top management turnover among the competitors of companies that are challenged by raiders will be higher after the raiders' appearance than before and will be higher than the normal rates of turnover in comparable companies.

Hypothesis 3b: The increase in top management turnover in the competitors of companies that are challenged by raiders will be higher in those with poor preraider performance than in those with high preraider performance.

Hypothesis 4a: Director turnover among the competitors of companies that are challenged by raiders will be higher after the raiders' appearance than before and will be higher than the normal rates of turnover in comparable companies.

Hypothesis 4b: The increase in director turnover in the competitors of companies that are challenged by raiders will be higher in those with poor preraider performance than in those with higher preraider performance.

METHODS

Data

Research data concerned three groups of companies: target companies, some of their competitors, and a control group of companies matched by size of sales.

The first group, target companies, consisted of 59 companies that were challenged by one of eight notorious raiders between 1979 and 1983. We derived the group from Kosnik's study of greenmail and corporate governance (1987). The raiders included were Carl Icahn, Saul Steinberg, David Murdock, the Belzberg family, the Bass family, Irwin Jacobs, Victor Posner, and Carl Lindner. They were selected on the basis of their widespread reputations as aggressive opportunity hunters, which were reflected in the frequency with which their activities were reported in the popular business press and in the emergence of controversies about their activities (*Business Week*, 1985a, 1985b). Reports in the *Wall Street Journal*, the *Wall Street Journal Index*, *Baron's*, the *Dow Jones News Service*, and *Mergers and Acquisitions* provided data on all the investment transactions made by the raiders and their affiliated corporations between 1979 and 1983. This information yielded a list of companies in each of which one of the raiders had obtained 5 percent or more of the outstanding equity. We verified the size and terms of the stock transactions using the raiders' 13D filings with the Securities and Exchange Commission (SEC), which are published periodically in the *SEC News Digest* and *Insiders' Chronicle*.² To ensure the credibility of the raiders' threats to the incumbent managements of firms, we

² Every investor who acquires 5 percent or more of a company's stock is required to file a 13D report with the SEC. These reports contain information about the size, terms, and purpose of the investments. We did not control for the raiders' various declared intentions in this research because they are very unreliable predictors of the raiders' subsequent actions (Kosnik, 1990; Stewart, 1991).

retained only those target companies (1) in which a raider had increased holdings within the year following the filing of a 13D report and (2) whose management the raider had publicly challenged. Our study group is composed of all companies targeted by the eight raiders named that met these criteria during the time period of the study.

The resulting 59 target companies had average sales of \$1,172,400,000, with a standard deviation of \$1,676,093,000, at the time of the 13D filing. The number of transactions for each of the raiders was as follows: Bass family, 12; Saul Steinberg, 11; Victor Posner, 10; Carl Lindner, 9; Carl Icahn, 6; David Murdock, 5; Belzberg family, 4; and Irwin Jacobs, 2.

A second group of companies were matched competitors of the target companies. We consulted *Dun and Bradstreet's Million Dollar Directory* to define the historical four-digit Standard Industrial Classification industry grouping for each target company at the time of the 13D filing. Within each industry grouping, we selected the company traded publicly on the New York or American stock exchanges that was closest in size (measured as sales) to a target company. Public ownership status was identified using data from the University of Chicago's Center for Research in Security Prices (CRSP), and the sales data were compiled from Standard and Poor's COMPUSTAT data base. The 59 competitors had average sales of \$1,147,971,000, with a group standard deviation of \$2,076,820,000.

A third group of control companies was constructed to control for company size only. Again, we used data from the historical CRSP and COMPUSTAT tapes to identify the publicly traded companies nearest in size to the target companies at the time of the 13D filings. The firms in the control group had average sales of \$1,178,252,000, with a standard deviation of \$1,694,192,000. An analysis of variance revealed no significant differences in the sizes of the companies in the three groups.

Design

Performance and turnover data were collected for each of the three groups of companies. Two elements of this research were exploratory. First, there is only scant evidence about the timing of performance-contingent management turnover (Walsh & Ellwood, 1991). Therefore, we measured turnover for a five-year period following the raiders' 13D filings (T to $T + 5$) and also made a historical measure, considering turnover in the five years prior to the raiders' appearances ($T - 5$ to T). Second, it is not clear how long it takes for poor managerial performance to manifest itself in a declining stock price. Therefore, we measured company performance for the five years prior to each five-year observation period for turnover ($T - 5$ to T and $T - 10$ to $T - 5$). Thus, we attempted to obtain performance data for the ten years prior to each 13D filing for each set of companies. Some of the targeted companies were not publicly traded throughout this entire ten-year period. As a result, our analysis of the relationships using a two-year assessment of performance was conducted on 57 companies. In all, these measures enabled us to examine whether poorly performing companies experienced subse-

quent disciplinary actions in the form of management and director turnover and whether a raider's appearance influenced this effect. Figure 1 illustrates the measurement strategy we employed in this research.

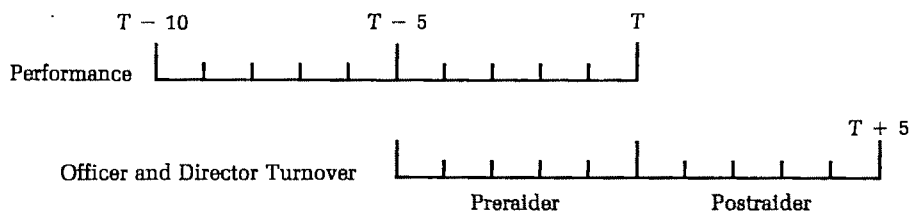
Measures

Turnover. Annual and cumulative turnover rates were established for three categories of officers and directors: (1) top executives without positions on their employer's board (officer); top executives with board positions (inside director); and board members without executive positions in the company on whose board they sat (outside director). Among the inside directors and officers were chairpersons, chief executive officers, presidents, executive vice presidents, senior vice presidents, and treasurers. We obtained turnover data by tracking top management and board composition in *Standard and Poor's Register of Corporations*. Companies that were acquired subsequent to a raider's 13D filing were identified first in the *Capital Changes Reporter* and then in the *Register of Corporations*.

Performance. We used CRSP data to identify each company's monthly market-adjusted return, which was defined as the simple excess return for any company's performance compared to the value-weighted market index for that month and expressed as $AR_{t,i} = R_{t,i} - R_t^m$, where $AR_{t,i}$ equals the abnormal return for company i in month t , $R_{t,i}$ equals the return for company i in month t , and R_t^m equals the return for the market in month t as reflected in the value-weighted index from the CRSP data base. Many models are available for assessing a company's abnormal stock price, but a review by Brown and Warner (1980) concluded that this simple computation of excess returns assesses performance as well as any of the more sophisticated methods. Indeed, Jensen and Murphy (1990) used this measure in their study of executive compensation. Corporate performance is reflected in the cumulative abnormal returns, which can be calculated for any interval during the ten-year observation period before a 13D filing date by summing the relevant abnormal monthly returns.

For each performance observation period, we defined five separate performance measures by calculating each company's cumulative abnormal returns for intervals of one year and two, three, four, and five years prior to (1) a given 13D filing (T) and five years prior to the 13D filing ($T - 5$). In order

FIGURE 1
Research Design



to allow a full factorial design, we later recoded these performance measures into a theoretically meaningful dichotomous variable by comparing a company's cumulative abnormal returns with the market average. For example, the available data for the group of target companies reveal that 23 target companies reported two-year cumulative performance indexes below the market average, and 34 target companies reported two-year cumulative performance indexes higher than the market average.

The mean two-year cumulative abnormal return across all the companies for the preraider period was .148, with a standard deviation of .494; the mean for the postraider period was .179, with a standard deviation of .496. A *t*-test of these means revealed that they were not significantly different. Perhaps more interesting is the test for differences in performance across the three sets of companies in each time period. One-way analyses of variance (ANOVAs) revealed that there were no significant differences across the companies in either time period (at the times of the 13D announcements, however, the mean two-year abnormal returns were .136, .257, and .143 in the target, competitor, and control companies, respectively). In all, there were no significant performance differences evident among our three sets of companies.

Analysis

We used analysis of variance in a fully crossed five-way factorial design to test the hypotheses. The five factors were company, coded as target (1), competitor (2), or size-matched control (3); level, coded as officer (1), inside director (2), or outside director (3); time, coded as the five-year observation period for turnover before a raider's 13D filing (1) or the five-year observation period for turnover after the raider's 13D filing (2); year, coded 1 through 5 to identify each year within each observation period for turnover; and performance, coded as cumulative abnormal returns below the market average (1) or cumulative abnormal returns above the market average (2). Annual turnover rates, defined as a percentage of the turnover within the total group of officers and directors, served as the dependent variable. We always referenced turnover against the cohort of officers and directors incumbent at the time of a given 13D filing and, to establish a historical pattern, a similar cohort of officers and directors incumbent five years before the 13D filing. Annual turnover was computed as the difference between consecutive cumulative turnover rates.

ANOVA analyses were repeated for each of the five cumulative performance measures, covering firm performance for intervals of one through five years prior to (1) a 13D filing (*T*) and (2) five years prior to the 13D filing (*T* - 5). Except for the analysis using the one-year performance data, the pattern of results of the five-way factorial analyses examining two through five years of cumulative performance were very similar. We decided to report the results of the analyses using the two-year cumulative performance measure in order to avoid redundancy and discuss the one-year performance results later in this article. The results of a fully interactive ANOVA are reported in

TABLE 1
Means, Standard Deviations, and Correlations^a

Variables	Means	s.d.	1	2	3	4	5
1. Time	1.50	0.50					
2. Year	3.00	1.41	.00				
3. Level	2.00	0.82	.00	.00			
4. Company	2.00	0.82	.00	.00	.00		
5. Performance	0.16	0.49	.03*	.00	.00	-.02	
6. Turnover	0.09	0.16	.01	-.08***	-.06***	-.02	-.03

^a Ns vary because of missing data.

* $p < .05$; *** $p < .001$.

spirit of sharing a complete account of the relationships in our data. The other analyses are available upon request.

RESULTS

Table 1 reports descriptive statistics and the correlations among the variables. Figure 2 illustrates cumulative turnover rates for all officers and directors before and after the raiders' 13D filings in each of the three study groups. A series of *t*-tests contrasting the preraider and postraider cumulative turnover rates within each of the five years and across all companies revealed no significant differences at the .05 level. At first blush, then, it appears that no unusual turnover activity is associated with raider ownership. All our hypothesis testing with ANOVA analyses, however, was conducted on the annual turnover rates. Given that our factorial design considered the year effect, the annual rates are interpreted most easily.

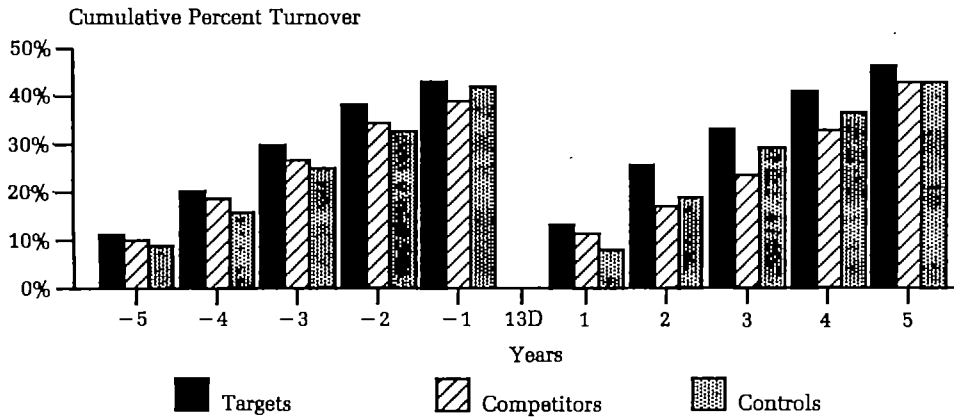
Table 2 presents our ANOVA results. We describe and interpret only those interaction effects relevant to our hypotheses;³ these interaction effects appear in the table in boldface type.

Performance-Independent Results

Hypotheses 1a and 2a predict that postraider officer and director turnover rates in target companies will be higher than their preraider turnover rates and also higher than the normal turnover rates in size-matched control companies. Examining the three-way interaction, company by time by year, allows an overall analysis of this contrast between pre- and postraider turnover rates for target companies. The interaction effect was not significant and hence failed to support the logic driving Hypotheses 1a and 2a. In sum, the results provide no evidence that the raiders' ownership had a significant

³ The significant main effects, however, describe the relationships in the data. For example, the mean turnover rates for the three categories of officers and directors are 10 percent for officers, 8 percent for inside directors, and 7 percent for outside directors. The mean turnover rates for years one through five are 10, 9, 9, 7, and 7 percent, respectively. Finally, the mean turnover rate for companies with below-market performance is 9 percent, and the rate for those with above-market performance is 8 percent.

FIGURE 2
Officer and Director Turnover



effect on officer and director turnover. The four-way interaction, company by level by time by year, indicates whether turnover rates differ for officers and directors. Since this interaction was also nonsignificant, we found no support for Hypotheses 1a and 2a in these data.

Hypotheses 3a and 4a predict that postraider officer and director turnover rates for the competitors of target companies will exceed both the competitors' preraider turnover rates and the normal turnover rates of size-matched control companies. Given that the three-way interaction (company by time by year) and the four-way interaction (company by level by time by year) were not significant, the hypotheses were not supported. In all, we find no support for any of our four performance-independent hypotheses in these data.

Performance-Dependent Results

The performance-independent results test a logic suggesting that a corporate raider's investment in a company is *prima facie* evidence that the company is in need of discipline. The four-way (company by time by year by performance) and five-way (company by level by time by year by performance) interactions allow us to test a control logic that includes level of preraider firm performance (Hypotheses 1b, 2b, 3b, and 4b).

The results are fully consistent with the logic of Hypotheses 1b and 2b. We predicted that postraider officer and director turnover rates for poorly performing target companies would be higher than postraider turnover rates for target companies performing well. As Table 2 reveals, a four-way interaction (company by time by year by performance) was highly significant ($p < .0001$). Since the five-way interaction (company by level by time by year by performance) was not significant, we must conclude that officers and directors are affected equally by this external control activity. Figures 3–8 present the results of one-way ANOVA analyses examining differences in

658.05
Ac 12

P 7996

TABLE 2
Results of Analyses of Variance for Annual Officer and
Director Turnover

Source of Variation	Sum of Squares	df	Mean Square	F	Significance
Level	.519	2	.260	10.478	.000
Company	.053	2	.027	1.078	.340
Time	.021	1	.021	0.845	.358
Year	.785	4	.196	7.913	.000
Performance	.121	1	.121	4.883	.027
Company × year	.435	8	.054	2.192	.025
Company × level	.010	4	.003	0.103	.982
Company × time	.015	2	.008	0.312	.732
Company × performance	.039	2	.019	0.781	.458
Level × time	.004	2	.002	0.073	.929
Level × year	.062	8	.008	0.311	.962
Level × performance	.006	2	.003	0.112	.894
Time × year	.031	4	.008	0.317	.867
Time × performance	.016	1	.016	0.657	.418
Year × performance	.176	4	.044	1.775	.131
Company × level × year	.832	16	.052	2.097	.006
Company × level × time	.039	4	.010	0.390	.816
Company × level × performance	.037	4	.009	0.369	.831
Company × time × year	.288	8	.036	1.431	.170
Company × time × performance	.034	2	.017	0.686	.504
Company × year × performance	.539	8	.067	2.718	.005
Level × time × year	.160	8	.020	0.807	.597
Level × time × performance	.024	2	.012	0.485	.816
Level × year × performance	.301	8	.038	1.516	.146
Time × year × performance	.083	4	.021	0.834	.503
Company × level × time × year	.340	16	.021	0.858	.619
Company × level × time × performance	.086	4	.021	0.865	.484
Company × level × year × performance	.661	16	.041	1.666	.046
Company × time × year × performance	.812	8	.101	4.095	.000
Level × time × year × performance	.402	8	.505	2.027	.040
Company × level × time × year × performance	.415	16	.026	1.047	.402
Explained variance	7.276	179	.041	1.640	.000
Residual variance	121.700	4,910	.025		
Total variance	128.976	5,089	.025		

pre- and postraider average annual turnover rates for the three sets of companies. For target companies with high performance, we found no significant differences in those rates throughout the five-year period. However, for poorly performing target companies, we found a significant difference in the predicted direction for the measurement point two years after the raiders' 13D filings: for poorly performing target companies, mean turnover was 15

percent, significantly higher than the rate five years earlier, 7 percent ($t_{1,123} = -2.43$; $p < .05$). We also examined the differences between target companies' postraider officer and director annual turnover and the normal annual turnover of the size-matched control companies with similar levels of performance. We found that in the first year after the raiders' 13D filings, the annual turnover rates for both target companies with poor ($\bar{x} = 11\%$) and those with good performance ($\bar{x} = 14\%$) were significantly higher than the rates for the control companies ($\bar{x} = 7\%$, $p < .01$, and $\bar{x} = 9\%$, $p < .05$).

Although the overall pattern of annual pre- and postraider officer and director turnover rates for poorly performing target companies is consistent with the performance-contingent logic of Hypotheses 1b and 2b, we found an interesting exception to this pattern in year four. Four years after the raiders' 13D filings, the annual turnover rates among poorly performing target companies declined sharply to preraider levels ($\bar{x} = 8\%$); this rate was significantly lower than the 16 percent average turnover rate five years earlier ($t_{1,123} = 1.96$, $p < .05$). As the distribution of means in Figure 3 suggests, that 16 percent rate was exceptionally high relative to the other rates for target companies with poor performance. It was also significantly higher than the corresponding turnover rates for the competitors ($\bar{x} = 5\%$, $p < .01$) and size-matched control companies ($\bar{x} = 5\%$, $p < .01$).

Pairwise comparisons of the annual officer and director postraider turnover rates for targets performing poorly and those performing well provided additional support for the performance-contingent logic of Hypotheses 1b and 2b (see Figures 3 and 4). Our results supported this reasoning for years two and three after the raiders' 13D filings, when respective mean turnover rates were 15 and 13 percent, significantly higher than the corre-

FIGURE 3
Officer and Director Turnover for Low-Performance Target Companies

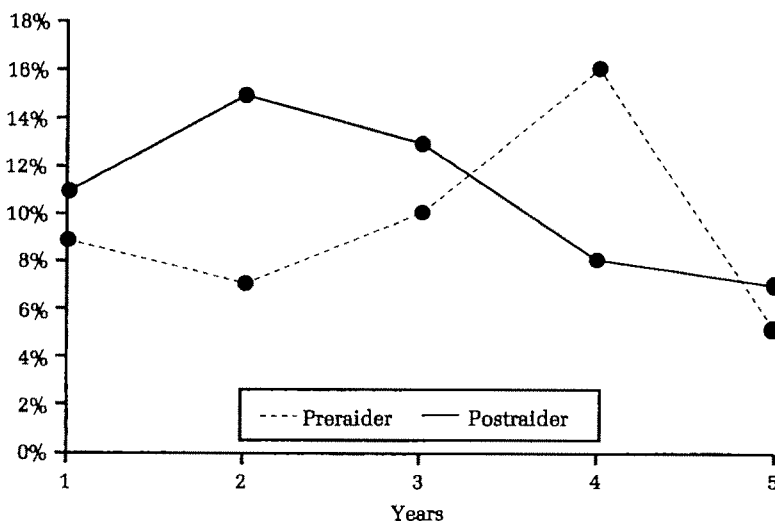


FIGURE 4
Officer and Director Turnover for High-Performance Target Companies

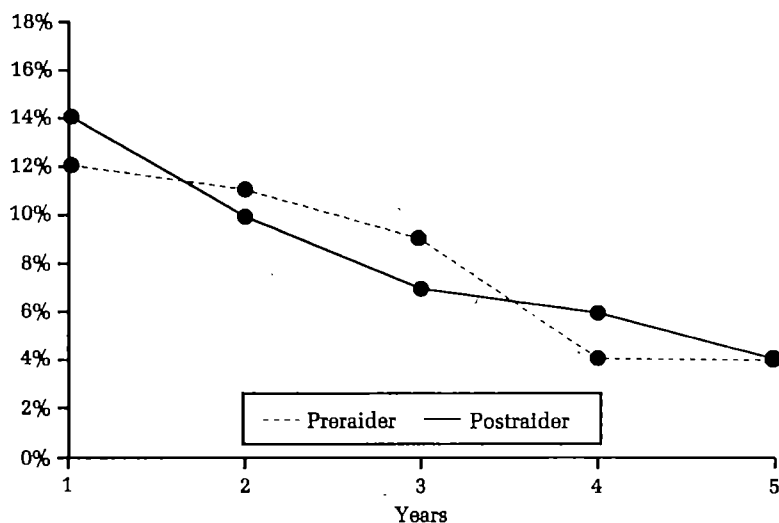
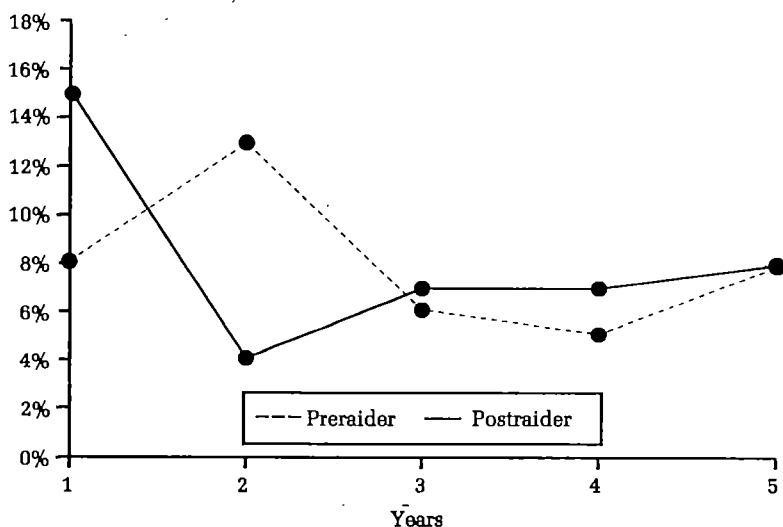


FIGURE 5
Officer and Director Turnover for Low-Performance Competitors



sponding turnover rates for target companies with good performance ($\bar{x} = 10$ and 7%, $p < .01$).

The significant four-way interaction, company by time by year by performance, and results of the one-way ANOVA analyses of annual turnover rates across competitors of target firms with the same performance levels (Figures 5 and 6) provide partial support for the performance-contingent

FIGURE 6
Officer and Director Turnover for High-Performance Competitors

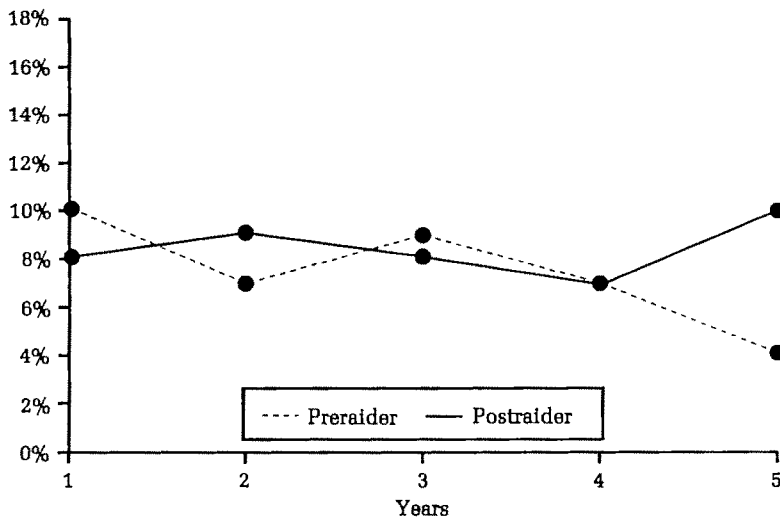
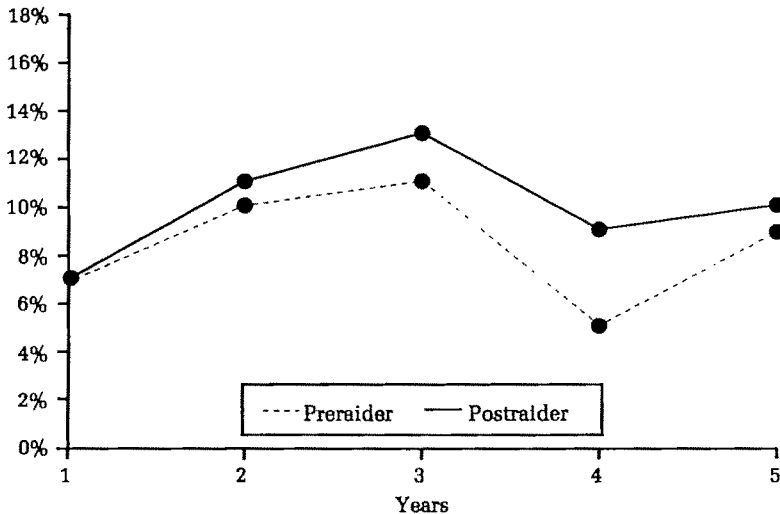
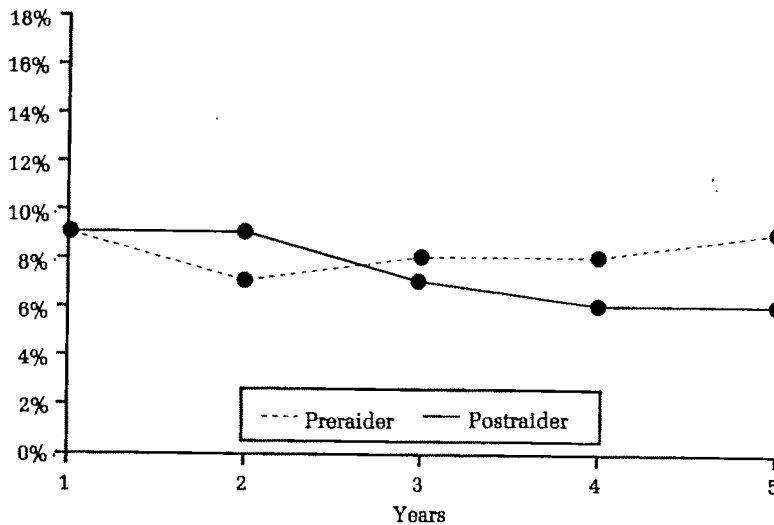


FIGURE 7
Officer and Director Turnover for Low-Performance Control Companies



logic of Hypotheses 3b and 4b. We predicted that postraider officer and director turnover among the poorly performing competitors of the target companies would be higher than among the competitors performing well. In the first year after the raiders' 13D filings, annual officer and director turnover rates for competitors of poorly performing targets were significantly higher ($\bar{x} = 15\%$) than their historical rates of five years earlier ($\bar{x} = 8\%$,

FIGURE 8
Officer and Director Turnover for High-Performance Control Companies



$t_{1,109} = -2.24, p < .05$). This average postraider turnover rate of 15 percent was also significantly higher than the comparable postraider turnover rates in the same post-13D year for size-matched control companies with comparable levels of performance ($\bar{x} = 7\%$, $p < .01$). For competitors of targets performing well, we found a significant difference in annual officer and director turnover rates five years after the raiders' 13D filings. In year five, the turnover rates for these competitors ($\bar{x} = 10\%$) were significantly higher than their turnover rates had been five years earlier ($\bar{x} = 4\%$, $t_{1,237} = -3.17$, $p < .01$), but these rates were not significantly different from the comparable rates for the size-matched control companies. As before, the nonsignificant five-way interaction, company by level by time by year by performance, revealed no significant differences between the turnover rates of officers and directors.

Interestingly, in the second year after the raiders' 13D filing, we found a distinct exception in the pre- and postraider officer and director turnover rates for the competitors of poorly performing target companies. Two years after the 13D filings, the annual turnover rates for these competitors dropped considerably, to a level ($\bar{x} = 4\%$) that was significantly lower than that of five years earlier ($\bar{x} = 13\%$, $t_{1,109} = 2.94$, $p < .01$). This 13 percent average turnover rate four years prior to the raiders' 13D filings constituted a distinct peak in the overall level of preraider turnover rates for competitors of poorly performing target companies. The drop in officer and director turnover after a year of high turnover may reflect the relative effectiveness of the discipline precipitated by the raiders' takeover threats.

Another noteworthy observation is that the postraider officer and director turnover for poorly performing target companies reached a high ($\bar{x} =$

15%) only in the second year after the raiders' 13D filings. In contrast, among the competitors of the poorly performing targets, average postraider officer and director turnover rose immediately after the raiders' 13D filings to a maximum of 15 percent. Hence, although poorly performing target companies took two years to react to the raiders' challenge, competitors reacted immediately.

DISCUSSION

Findings

Corporate raiders and financial economists alike have underwritten the theory of the market for corporate control. Many have praised the ubiquity and persistence of the takeover market as critical for stimulating the efficient management of publicly owned corporations. Nevertheless, systematic research testifying to the effectiveness of raiders and the market for corporate control in disciplining ineffective management teams and boards of directors is scarce. Our research attempted to fill that void.

Overall, we found little evidence to support the claim that corporate raiders can accurately identify and eliminate ineffective boards of directors and entrenched management teams. The preraider performance of the targeted companies conditioned the only evidence of increased postraider turnover: In target companies with sustained poor performance prior to a raider's appearance, a significant rise in officer and director turnover occurred in the second year after the raider's 13D filing. This turnover pattern was clearly distinct from that in target companies with above-average preraider performance. The rather weak nature of this support for raiders' disciplining role in the market for corporate control is consistent with the failure of previous studies to provide evidence supporting the disciplinary effect of the takeover market (Martin & McConnell, 1991; Walsh & Ellwood, 1991).

We highlighted a new view of the potential disciplinary role of takeovers in our comparison of the turnover rates for officers and their directors, finding that, in general and regardless of preraider firm performance, turnover in the five-year period following the raiders' 13D filings equally affected the target companies' officers and their inside and outside directors. Although our understanding of the process of directors' discipline is currently inscrutable, it is noteworthy to discover that their tenure may be performance-contingent. Earlier theories of the market for corporate control focused entirely on the market's discipline of ineffective corporate executives (Fama & Jensen, 1983). Boards of directors, however, are the ultimate internal monitor of managerial performance. Managerial entrenchment can only exist to the extent that boards tolerate it (Kosnik, 1987). Hence, it is not surprising to learn that the disciplinary effect exerted by the threat of a corporate control contest extends to the targets' board members. Our challenge now is to discover how these ultimate internal monitors are themselves monitored and controlled.

The raiders' disciplinary effect appears to diffuse among the target com-

panies' competitors: Competitors of target companies with poor preraider performance experienced a dramatic increase in officer and director turnover one year after the raiders acquired minority positions in the target companies. Given that the competitors' officer and director turnover in subsequent years was considerably lower than in the first year, it seems plausible that the sudden rise was triggered by the raiders' challenges. Competitors may decide to engage in officer and director changes in an attempt to avoid the possibility that raiders will broaden their pursuit of firms with inefficient control practices to others in the same industry as a given target.

This diffusion effect may be seen as evidence of mimetic isomorphism (Powell & DiMaggio, 1991). Responding to a raider's challenge by means of officer and director changes, target companies might institute new expectations regarding corporate governance in their institutional fields. The pressure for conformity to industry norms may oblige competitors to follow the target company's lead. Therefore, by challenging specific companies, raiders may initiate the spread of more efficient control practices to a number of other firms.

Implications for Theory and Practice

One of the hallmarks of provocative research is that it generates even more questions for continued research than it answers. In this case, our results prompt us to raise questions about the fundamental nature of corporate discipline, the attributes of companies chosen and avoided as takeover targets, the efficiency of this external control activity, and the broad theory that guided our research effort.

The nature of corporate discipline. Our results about officer and director turnover signal a need both to better understand these turnover processes and to consider the disciplinary alternatives to them. The processes of CEO succession are fairly well understood (Vancil, 1987), but academics know little about director turnover. In light of Gamson and Scotch's (1964) notion of ritualistic scapegoating, it is plausible that CEOs pressure directors to resign in the face of poor firm performance. The CEOs may be attempting to signal, accurately or not, that they have been laboring under incompetent direction from their boards (Walsh & Seward, 1990). Of course, this action presumes that the directors serve at the discretion of the CEOs (Mace, 1971). Alternatively, directors themselves may decide to quit a firm in the hope of avoiding damage to their reputations or, perhaps worse, a director's liability suit. Finally, it may be that shareholders (or blockholders) may seek a director's resignation. Indeed, the popular business press recently reported on how institutional investors are working to ensure that directors fulfill their fiduciary duties (*Fortune*, 1992). All these propositions await a future investigation.

Although this research focused on externally induced, forced top manager and director turnover, it should be noted that postacquisition turnover may reflect voluntary decisions by managers and directors as well. Cultural

differences between acquiring and target firms, the loss of executive power, alternative career opportunities, and such financial incentives as golden parachutes are likely to influence voluntary postacquisition turnover decisions by target firm executives. In addition to external discipline, postacquisition top manager turnover may also result from the implementation of operational synergies between the firms.

The presence and magnitude of the turnover effects that we observed in this group of firms was never exceptionally high. They certainly were not as high as the raiders' self-proclaimed image as champions of shareholders' rights would lead one to expect (Icahn, 1988). One interpretation of this modest result is that the raiders' disciplinary effect is not as pronounced as has commonly been accepted. Another interpretation is that there is more to discipline than dismissing officers and directors. Shleifer and Vishny (1991), for example, argued that the hostile takeovers of the last decade served to undo the excessive conglomerate diversification activities of the 1960s. The key to discipline, then, may not reside in the dismissal of officers and directors but rather in a change in their strategic thinking. In the case of the acquisitions of the 1980s, deconglomeration decisions may embody discipline as much as dismissal. This interpretation is consistent with recent research on strategic and organizational change. For example, research has indicated that the effect of executive succession on subsequent firm performance and strategy is not clear-cut (e.g., Carroll, 1984; Friedman & Singh, 1989; Romanelli & Tushman, 1988). In order to make a difference in firm performance, executive succession may need to be part of a broader reorganization or strategic change program (Virany, Tushman, & Romanelli, 1992).

In the end, the discipline engendered by the raiders studied here appears to be very similar to the discipline revealed in firms not subject to external control challenges. Poor firm performance begets top management turnover (see Furtado and Karan [1990] for a review). Redirecting a firm involves more than changing the names of the officers and directors on the annual report. Continuing efforts to understand corporate control should untangle the relationships among and between dismissing officers and directors and the various other means of controlling them that are available, such as adjusting incentive contracts (Jensen & Murphy, 1990), altering a firm's financial structure (Jensen, 1986) and charting a new strategic direction (Shleifer & Vishny, 1991).

Choice of targets. Our results about the diffusion of discipline ask us to consider why some companies are chosen as raiders' targets and others are not. The turnover profiles in the preraider period may give us a clue. One noteworthy finding is that the poorly performing target companies evidenced abnormally high officer and director turnover in the period two years before a raider surfaced as a 5 percent owner. This turnover may reflect a palliative response to an anticipated control contest, but a more parsimonious explanation is that raiders are attracted to companies that show a willingness to discipline themselves for poor performance. These companies

may represent a better bet for subsequent salutary performance than the targets' nearest competitors—even though these competitors showed a willingness to act immediately in response to the raiders' challenges.

Our research also reveals that the raiders' self-acclaimed role as agents in the market for corporate control who pursue and dismiss ineffective and entrenched management teams does not fully account for their activities. Indeed, more than half of these targeted companies outperformed the market in the two years previous to the revealing of the raiders' ownership interests; moreover, there is no evidence of unusual officer and director discipline in these companies. Therefore, the raiders' incendiary rhetoric about incompetent management in these and other companies is perplexing. Although we are not yet prepared to indict the raiders for engaging in a "blaming the victim" activity that might obfuscate an inquiry into less noble motives on their part, we are suspicious. Just the same, to be fair, we need to be aware that raider discipline may take a form not investigated here.

It may very well be that not all raiders are created equal. Unfortunately, the design of our study does not allow us to systematically test for effects of particular raiders in our data. Nevertheless, we can profile which raiders bought which companies. Table 3 reveals that the Bass family was particularly attracted to companies with a two-year history of below-market performance. The other raiders seemed to be more drawn to companies that outperformed the market. It may be, then, that the Bass family embodies the operation of the market for corporate control as we know it theoretically, but the others are attracted to other disciplinary approaches, if, indeed, the idea of discipline plays a role in their thinking at all.

The efficiency of external corporate control. The mixed results of this research and previous studies highlight the limits of academic knowledge about the efficacy of externally induced corporate discipline. Certainly the raiders' visibility and activity have declined over the last few years. Nevertheless, their role in stimulating and shaping the market for corporate control throughout the 1980s was substantial and cannot be ignored. The legacy of this activity has been debated extensively in academic circles (Brudney,

TABLE 3
A Profile of Corporate Raiders' Targets

Corporate Raiders	Two-Year Market Performance		Total
	Below Average	Above Average	
Bass	8	4	12
Belzberg	0	4	4
Icahn	2	4	6
Jacobs	2	0	2
Lindner	2	7	9
Murdock	2	2	4
Posner	5	5	10
Steinberg	2	8	10
Total	23	34	57

1982; Herman & Lowenstein, 1988; Holderness & Sheehan, 1985; Jensen, 1987) and in the popular business press (Bennett, 1986; *Business Week*, 1985a, 1985b). Although some commentators have praised the market for corporate control and its actors as a highly effective mechanism for motivating top executives and curtailing managerial inefficiency (e.g., Coffee, 1988; Jensen, 1987), others have criticized this external discipline as too expensive and drastic (Law, 1985), as an arena for hubris (Roll, 1986), or even as a simple smokescreen for greed (Sigler, 1989).

Those who have studied the long-term consequences of mergers and acquisitions in this century have concluded that most mergers and acquisitions fail to realize their promise of profitability and improved performance (Fowler & Schmidt, 1989; Hitt, Hoskisson, Ireland, & Harrison, 1991; Herman & Lowenstein, 1988; Hogarty, 1970; Mueller, 1977; Ravenscraft & Scherer, 1987). Chatterjee (1992), for instance, rejected the economic legitimacy of the discipline motive for takeovers and suggested that takeovers are only value creating to the extent that synergies are realized. Of course, many have noted the difficulties of successfully integrating two different firms and realizing such synergies (Haspeslagh & Jemison, 1991; Schweiger & Walsh, 1990). Therefore, if the point of the takeover market is to discipline a handful of ineffective and entrenched officers and directors, analysts should acknowledge the attendant costs of this activity. The manifest expectations about the ability of external change agents to turn around undervalued companies may appear to have been overstated. Indeed, the cure in these instances may be worse than the disease.

Agency theory revisited. All our comments so far have been premised on the idea that agency theory and the theory of the market for corporate control are valid. Notwithstanding the popular acclaim these theories have garnered in academic and business circles, we should point out that their validity has yet to be established. Indeed, we found only limited support for the theory of the market for corporate control in this research. A strength of these theories is that they open investigators' eyes to the kinds of questions that we have been asking in this research and as a consequence of this research. A limitation is that the uncritical embrace of the theories' assumptions can victimize managers. Indeed, this potential for victimization leads us to question the motives of those who celebrate the theories.

A central tenet of agency theory is that principals need to worry about their agents, who may think and pursue their own interests at the expense of the principals' interests. The ubiquity of this self-serving behavior has never been established, however. March (1984) noted that such opportunism could be an infrequent phenomenon, arguing that the socialization pressures are so strong on executives as they advance through a firm's labor market that the emerging candidates for top management positions are as alike as the lightbulbs in a package. Fama (1980) also noted that mutual monitoring processes work to keep senior managers focused on maximizing firm value. In line with such thinking, Donaldson (1990) argued that top managers should be considered to be principals' stewards rather than their agents. A recent re-

port by the Council on Competitiveness (1992) concluded that the shortcomings of American industry cannot be blamed solely on problems of corporate governance or management's short time horizons. Rather, managers and owners alike are trapped in an inadequate "system of allocating investment capital within and across companies" (Council on Competitiveness, 1992: 3). The report specifically blames the system's "extreme approach to managing decentralization [of unrelated business units], its limited flow of information, its heavy use of certain types of incentive compensation systems [those tied to measurable financial returns rather than corporate position], and its reliance on financial control and quantitative capital budgeting processes" (Council on Competitiveness, 1992: 17). The point here is that as academics continue to refine agency theory's predictions, they need to be alert to the possibility that the hypothesized effects may be much more narrowly circumscribed than the theory's proponents might argue.

We began this article with an observation that the theory of the market for corporate control is unique for its widespread currency in the absence of a critical test of its veracity. The limited support for the theory revealed in the previous work of Martin and McConnell (1991) and Walsh and Ellwood (1991) and in our own data, coupled with the gloomy portrait of postacquisition performance consistently revealed in the extant research literature, leads us finally to consider Perrow's (1986) critique of agency theory. Consistent with our earlier questioning of the base rate of opportunistic behavior is his argument that self-interest should be considered as a variable rather than fixed property in organizational life (cf. Kosnik & Bettenhausen, 1992). And perhaps most important, Perrow asks scholars to question the self-interested behavior of principals. The raiders' support for a theory that questions the integrity of their target companies' officers and directors may provide an impenetrable ideological cover for their own self-interested intentions. In essence, we want to be sure that continued research efforts entertain the possibility that both principals and agents will abuse their power. In the meanwhile, we all may be well-served to treat the theory of the market for corporate control as a testable theory, and not as an immutable law of corporate behavior.

REFERENCES

- Amihud, Y., & Lev, B. 1981. Risk reduction as a managerial motive for conglomerate mergers. *Bell Journal of Economics*, 12: 650-667.
- Asquith, P. 1983. Merger bids, uncertainty, and stockholder returns. *Journal of Financial Economics*, 11: 51-83.
- Bacon, J., & Brown, J. K. 1975. *Corporate directorship practices: Role, selection and legal status of the board*. New York: Conference Board.
- Bartley, J., & Boardman, C. 1986. The replacement-cost adjusted valuation ratio as a discriminator among takeover target firms. *Journal of Economics and Business*, 38(1): 41-55.
- Bennett, A. 1986. After the merger, more CEOs left in uneasy spot: Looking for work. *Wall Street Journal*, August 27: 19.

- Berle, A. A., Jr., & Means, G. C. 1932. *The modern corporation and private property*. New York: Macmillan.
- Boeker, W., & Goodstein, J. 1991. Organizational performance and adaptation: Effects of environment and performance on changes in board composition. *Academy of Management Journal*, 34: 805–826.
- Boeker, W., & Goodstein, J. 1993. Performance and successor choice: The moderating effects of governance and ownership. *Academy of Management Journal*, 36: 172–186.
- Brown, S. J., & Warner, J. B. 1980. Measuring security price performance. *Journal of Financial Economics*, 8: 205–258.
- Brudney, V. 1982. The independent director—Heavenly city or Potemkin village? *Harvard Law Review*, 95(3): 597–659.
- Business Week*. 1985a. Corporate fear and trembling. Worried oil companies wonder when Pickens will strike next. January 14: 51–52.
- Business Week*. 1985b. The raiders: They are really breaking the vise of the managing class. March 4: 80–91.
- Business Week*. 1987a. The downfall of a CEO. The inside story of Bill Bricker's reign at Diamond Shamrock. February 16: 76–84.
- Business Week*. 1987b. The battle for corporate control. May 18: 102–109.
- Business Week*. 1989. Taking charge. Corporate directors start to flex their muscle. July 3: 66–73.
- Carroll, G. R. 1984. Dynamics of publisher succession in newspaper organizations. *Administrative Science Quarterly*, 29: 93–113.
- Chatterjee, S. 1992. Sources of value in takeovers: Synergy or restructuring—Implications for target and bidder firms. *Strategic Management Journal*, 13: 267–286.
- Coffee, J. C. 1988. Shareholders versus managers: The strain in the corporate web. In J. C. Coffee, L. Lowenstein, & S. Rose-Ackerman (Eds.), *Knights, raiders, and targets*: 77–134. New York: Oxford University Press.
- Council on Competitiveness. 1992. *Capital choices. Changing the way America invests in industry*. Washington, DC: Council on Competitiveness.
- Council of Economic Advisers. 1985. *Annual Report*. Washington, DC: Council of Economic Advisers.
- Coughlan, A. T., & Schmidt, R. M. 1985. Executive compensation, managerial turnover, and firm performance: An empirical investigation. *Journal of Accounting and Economics*, 7: 43–66.
- Donaldson, L. 1990. The ethereal hand: Organizational economics and management theory. *Academy of Management Review*, 15: 369–381.
- Easterbrook, F. H., & Fischel, D. R. 1981. The proper role of a target's management in responding to a tender offer. *Harvard Law Review*, 94(6): 1164–1204.
- Fama, E. F. 1980. Agency problems and the theory of the firm. *Journal of Political Economy*, 88: 288–307.
- Fama, E. F., & Jensen, M. C. 1983. Separation of ownership and control. *Journal of Law and Economics*, 26: 301–325.
- Fortune*. 1985. Have takeovers gone too far? May 27: 20–24.
- Fortune*. 1992. Directors, wake up! June 15: 87–92.
- Fowler, K. L., & Schmidt, D. R. 1989. Determinants of tender offer post-acquisition financial performance. *Strategic Management Journal*, 10: 339–350.

- Friedman, S., & Singh, H. 1989. CEO succession and stakeholder reaction. *Academy of Management Journal*, 32: 718-744.
- Furtado, E. P. H., & Karan, V. 1990. Causes, consequences, and shareholder wealth effects of management turnover: A review of the empirical evidence. *Financial Management*, 19(2): 60-75.
- Gamson, W. A., & Scotch, N. A. 1964. Scapegoating in baseball. *American Journal of Sociology*, 70: 69-72.
- Gilson, S. C. 1989. Management turnover and financial distress. *Journal of Financial Economics*, 25: 241-262.
- Golbe, D. L., & White, L. J. 1988. A time-series analysis of mergers and acquisitions in the U.S. economy. In A. J. Auerbach (Ed.), *Corporate takeovers: Causes and consequences*: 265-302. Chicago: University of Chicago Press.
- Hasbrouck, J. 1985. The characteristics of takeover targets and other measures. *Journal of Banking and Finance*, 9: 351-362.
- Haspeslagh, P. C., & Jemison, D. B. 1991. *Managing acquisitions*. New York: Free Press.
- Herman, E. S. 1981. *Corporate control, corporate power*. New York: Cambridge University Press.
- Herman, E. S., & Lowenstein, L. 1988. The efficiency effects of hostile takeovers. In J. C. Coffee, L. Lowenstein, & S. Rose-Ackerman (Eds.), *Knights, raiders, and targets*: 211-240. New York: Oxford University Press.
- Hitt, M. A., Hoskisson, R. E., Ireland, R. D., & Harrison, D. 1991. Effects of acquisitions on R&D inputs and outputs. *Academy of Management Journal*, 34: 693-706.
- Hogarty, T. F. 1970. Profits from merger: The evidence of fifty years. *St. John's Law Review*, 44: 378-391.
- Holderiness, C. G., & Sheehan, D. P. 1985. Raiders or saviors? The evidence on six controversial investors. *Journal of Financial Economics*, 14: 555-579.
- Icahn, C. 1988. Icahn on Icahn. *Fortune*, February 29: 54-58.
- Jarrell, G. A., Brickley, J. A., & Netter, J. M. 1988. The market for corporate control: The empirical evidence since 1980. *Journal of Economic Perspectives*, 2: 49-68.
- Jarrell, G. A., & Poulsen, A. B. 1987. Shark repellents and stock prices: The effects of antitakeover amendments since 1980. *Journal of Financial Economics*, 16: 127-168.
- Jensen, M. C. 1986. Agency costs of free cash flow, corporate finance and takeovers. *American Economic Review*, 76: 323-329.
- Jensen, M. C. 1987. A helping hand for entrenched managers. *Wall Street Journal*, November 4: 36.
- Jensen, M. C., & Meckling, W. H. 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3: 305-360.
- Jensen, M. C., & Murphy, K. J. 1990. Performance pay and top management incentives. *Journal of Political Economy*, 98: 225-264.
- Jensen, M. C., & Ruback, R. S. 1983. The market for corporate control: The scientific evidence. *Journal of Financial Economics*, 2: 5-50.
- Jensen, M. C., & Smith, C. 1985. Stockholder, manager, and creditor interests: Applications of agency theory. In E. J. Altman & M. G. Subrahmanyam (Eds.), *Recent advances in corporate finance*: 95-131. Homewood, IL: Irwin.
- Kosnik, R. D. 1987. Greenmail: A study of board performance in corporate governance. *Administrative Science Quarterly*, 32: 163-185.

- Kosnik, R. D. 1990. Effects of board demography and directors' incentives on corporate green-mail decisions. *Academy of Management Journal*, 33: 129–150.
- Kosnik, R. D., & Bettenhausen, K. L. 1992. Agency theory and the motivational effect of management compensation: An experimental contingency study. *Group and Organization Management*, 17: 309–330.
- Law, W. A. 1986. A corporation is more than its stock. *Harvard Business Review*, 64(3): 80–83.
- Lorsch, J. W., & MacIver, E. 1989. *Pawns or potentates: The reality of America's corporate boards*. Boston: Harvard Business School Press.
- Mace, M. L. 1971. *Directors: Myth and reality*. Boston: Harvard University Press.
- Manne, H. G. 1965. Mergers and the market for corporate control. *Journal of Political Economy*, 73: 110–120.
- March, J. G. 1984. Notes on ambiguity and executive compensation. *Scandinavian Journal of Management*, 1: 53–64.
- Martin, K. J., & McConnell, J. J. 1991. Corporate performance, corporate takeovers, and management turnover. *Journal of Finance*, 46: 671–688.
- Morck, R., Shleifer, A., & Vishny, R. W. 1988a. Characteristics of targets of hostile and friendly takeovers. In A. J. Auerbach (Ed.), *Takeovers: Causes and consequences*: 101–136.
- Morck, R., Shleifer, A., & Vishny, R. W. 1988b. Management ownership and market valuation. *Journal of Financial Economics*, 20: 293–315.
- Morck, R., Shleifer, A., & Vishny, R. W. 1989. Alternative mechanisms for corporate control. *American Economic Review*, 79: 842–852.
- Mueller, D. C. 1977. The effects of conglomerate mergers: A survey of the empirical evidence. *Journal of Banking and Finance*, 1: 313–347.
- Perrow, C. 1986. *Complex organizations: A critical essay* (3d ed.). New York: Random House.
- Pickens, T. B. 1986. Professions of a short-termer. *Harvard Business Review*, 64(3): 75–79.
- Powell, W. W., & DiMaggio, P. J. 1991. *The new institutionalism in organizational analysis*. Chicago: University of Chicago Press.
- Ravenscraft, D. J. 1987. The 1980s merger wave: An industrial organization perspective. In L. E. Browne & E. S. Rosengren (Eds.), *The merger boom*: 17–37. Boston: Federal Reserve Bank of Boston.
- Ravenscraft, D. J., & Scherer, F. M. 1987. *Mergers, sell-offs and economic performance*. Washington, DC: Brookings Institute.
- Reich, C. 1982. The man CEOs love to hate. *Institutional Investor*, 16(10): 147–153.
- Roll, R. 1986. The hubris hypothesis of corporate takeovers. *Journal of Business*, 59: 197–216.
- Romanelli, E., & Tushman, M. L. 1988. Executive leadership and organizational outcomes: An evolutionary perspective. In D. Hambrick (Ed.), *The executive effect: Concepts and methods for studying top managers*: 129–254. Greenwich, CT: JAI Press.
- Schweiger, D. M., & Walsh, J. P. 1990. Mergers and acquisitions: An interdisciplinary view. In K. M. Rowland & J. R. Ferris (Eds.), *Research in personnel and human resource management*, vol. 8: 41–107. Greenwich, CT: JAI Press.
- Shleifer, A., & Vishny, R. W. 1988. Value maximization and the acquisition process. *Journal of Economic Perspectives*, 2(1): 7–20.
- Shleifer, A., & Vishny, R. W. 1991. Takeovers in the 60s and 80s: Evidence and implications. *Strategic Management Journal*, 12: 51–59.
- Sigler, A. 1989. What is a corporation's responsibility in the U.S. today? In W. M. Hoffman, R.

- Frederick, & E. S. Petry (Eds.), *The ethics of organizational transformation*: 85–90. New York: Quorum Books.
- Stewart, J. B. 1991. *Den of thieves*. New York: Simon & Schuster.
- Vancil, R. F. 1987. *Passing the baton: Managing the process of CEO succession*. Boston: Harvard Business School Press.
- Varian, H. R. 1988. Symposium on takeovers. *Journal of Economic Perspectives*, 2(1): 3–5.
- Virany, B., Tushman, M. L., & Romanelli, E. 1992. Executive succession and organization outcomes in turbulent environments: An organization learning approach. *Organization Science*, 3(1): 72–91.
- Walsh, J. P. 1988. Top management turnover following mergers and acquisitions. *Strategic Management Journal*, 9: 173–183.
- Walsh, J. P., & Ellwood, J. W. 1991. Mergers, acquisitions, and the pruning of managerial deadwood. *Strategic Management Journal*, 12: 201–217.
- Walsh, J. P., & Seward, J. K. 1990. On the efficiency of internal and external corporate control mechanisms. *Academy of Management Review*, 15: 421–458.
- Warner, J. B., Watts, R. L., & Wruck, K. H. 1988. Stock prices and top management changes. *Journal of Financial Economics*, 20: 461–492.
- Weisbach, M. C. 1988. Outside directors and CEO turnover. *Journal of Financial Economics*, 20: 431–460.
- Wolfson, N. 1984. *The modern corporation: Free market versus regulation*. New York: McGraw-Hill.

James P. Walsh (Ph.D., Northwestern University) is an associate professor of business administration in the School of Business Administration at the University of Michigan. His current research interests focus on understanding information processing in organizations as well as on corporate control processes.

Rita D. Kosnik (Ph.D., Northwestern University) is an associate professor of management at Trinity University. Her current research interests include problems of corporate governance and corporate restructuring.

ORGANIZATIONAL ESCALATION AND EXIT: LESSONS FROM THE SHOREHAM NUCLEAR POWER PLANT

JERRY ROSS

Illinois State University

BARRY M. STAW

University of California, Berkeley

Although there is a relatively large literature on escalating commitment, almost all the research it describes has concerned individuals rather than organizations. Therefore, to provide additional grounding for an organizational theory of escalation, we examined the Long Island Lighting Company's decision to build and operate the Shoreham Nuclear Power Plant. Shoreham's cost, estimated to be \$75 million when the project was announced in 1966, rose over the next 23 years to over \$5 billion. A negotiated agreement with New York State finally resulted in Long Island Lighting's abandoning Shoreham without its ever having begun operation. Examination of the Shoreham decision provided support for a temporal model of escalation and helped us develop new theory on how escalation episodes may ultimately be resolved.

Much of organizational theory can be reduced to two fundamental questions—how do we get organizations moving, and how do we get them stopped once they are moving in a particular direction?

Although the above statement is an oversimplification, it does focus attention on a fundamental dichotomy in theory as well as on an imbalance in the current research literature. The vast majority of organizational studies have been devoted to understanding why and how organizations initiate action; they range from individual-level studies on motivation, through group research on decision making, to the examination of organizational design and strategy as a response to environmental conditions. Far less attention has been devoted to understanding and resolving pathological organizational persistence. The implicit assumption has been that, should organ-

We would like to express our deep appreciation to all of the individuals who so freely gave of their time to assist us in this project. Special thanks are due to Karl Grossman and John Rather. We also owe a debt to the outstanding print media coverage of the Shoreham project, particularly in the *New York Times*. The account provided in our article is, due to space limitations, extremely limited. We would be happy to provide an expanded list of references to those readers seeking additional detail. Jerry Ross would also like to thank Michael Brimm for his advice and encouragement on this project. Barry Staw would like to acknowledge support from the Institute of Industrial Relations, University of California, Berkeley.

izational actions and programs overshoot their mark, such persistence will eventually be curbed by market forces.

One area of research that has directly examined the ending of organizational programs is that on the escalation of commitment. Over the past 15 years, a series of experiments has documented a tendency for individuals to become locked into losing situations, in a sense "throwing good money after bad" (e.g., Brockner & Rubin, 1985; Staw, 1976; Teger, 1980). However, so far, nearly all this research has centered on individual behavior and has been based on short-term laboratory experiments. Little research has examined how organizations become committed to losing courses of action over time, tracing such commitment from initial project outlays through the receipt of substantial losses.

THEORETICAL BACKGROUND

It can be argued that major organizational decisions to persist or withdraw from a course of action are far more complicated than the escalation literature often implies. Organizational escalation decisions may involve numerous variables at multiple levels of analysis. Such decisions may also be more dynamic than those represented in the experimental literature, since the influence of various determinants of escalation may change over time. Thus, in earlier work (Staw & Ross, 1987), we proposed that organizational escalations may involve the interplay of four sets of forces over time.

Determinants of Escalation

Project determinants. Under this rubric are objective aspects of a project, such as its closing costs, its salvage value, the causes of setbacks to its completion, and the economic merits of pursuing or dropping it; Northcraft and Wolf (1984), McCain (1986), Bateman (1983), and Staw and Fox (1977) give examples of research on project variables.

Psychological determinants. This category includes "reinforcement traps" (Platt, 1973), such as difficulties in withdrawing from a previously rewarded activity; individual motivations, such as the need for self-justification; decision-making errors, such as trying to recoup "sunk costs" (resources already invested in a project); and biases in information processing, such as tendencies to slant data in the direction of preexisting beliefs. Goltz (1992), Staw (1976), Arkes and Blumer (1985), and Conlon and Parks (1987) provide examples of research on psychological determinants.

Social determinants. Included here are interpersonal processes that may lead to excess commitment, such as desires to justify losing projects to potentially hostile audiences (Fox & Staw, 1979), modeling of others' behavior in similar circumstances (Brockner, Rubin, & Lang, 1981), and cultural norms favoring consistent, or strong, leadership (Staw & Ross, 1980).

Organizational determinants. Under this category come such variables as the level of political support for a project within an organization (Pfeffer, 1981), the level of economic and technical "side-bets" incurred by the organ-

ization with respect to the project (hiring of staff, development of expertise) (March, 1978), and the extent of the project's institutionalization within the organization—how tied it is to the firm's values and objectives (Goodman, Bazerman, & Conlon, 1980).

Mapping the Forces of Escalation

Figure 1 shows a temporal model depicting organizational escalation as a four-stage process (Ross & Staw, 1986; Staw & Ross, 1987). Examining the top half of the figure shows that the typical escalation episode can be seen as beginning with the bright promise of future outcomes through a given course of action. The course of action gradually but progressively becomes a losing proposition during the second and third stages, ending in the fourth stage with substantial negative results. Although one might expect individuals and organizations to flee from such a losing situation, the temporal model shows that countervailing forces tend to build up over time, making it more difficult to withdraw than would be expected if only economic results were considered. The model shows that psychological, social, and organizational forces tend to be most influential at the early, middle, and late stages of an escalation episode, respectively. Project variables appear to be most important at both the early and late stages of an episode. We can summarize the temporal model of escalation with the following propositions:

Proposition 1: Organizational escalation is determined by a combination of psychological, project, social, and organizational determinants.

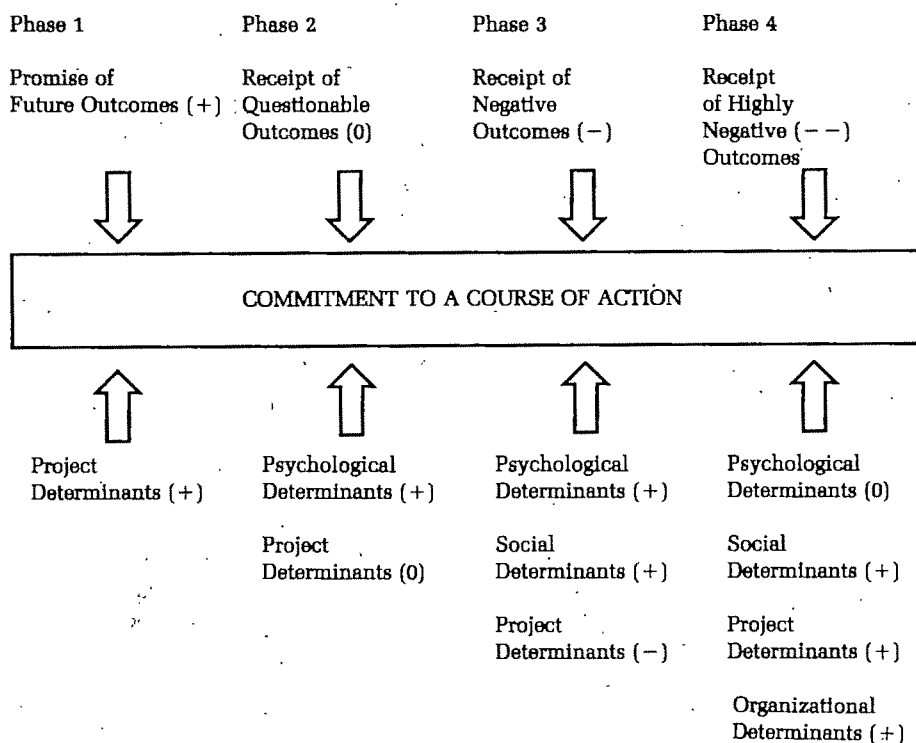
Proposition 2: There is a temporal ordering in the influence of the determinants of organizational escalation—project variables are most important at the early stages of an escalation episode, psychological and social variables are dominant at the middle stages, and both organizational and project considerations become most influential at the late or ending stage of the typical escalation episode.

The Need for Further Research

Although Figure 1 and the propositions based on it make conceptual sense, the empirical support for the temporal model of escalation is still somewhat weak. So far, the only empirical study of organization-level escalation has been our case study of British Columbia's decision to hold a world's fair, "Expo 86" (Ross & Staw, 1986). Because the temporal model of escalation was essentially based on this case study, our two propositions have not yet received an independent test. The case study described herein, which concerns a project of the Long Island Lighting Company (LILCO), the Shoreham Nuclear Power Plant, was designed to provide such an independent test of Propositions 1 and 2, as well as an exploration into exit processes not addressed by the temporal model.

The present article examines organization-level escalation by presenting

FIGURE 1
A Temporal Model of Escalation^a



^a This model is drawn from Staw and Ross (1987).

a detailed case study of investment in a nuclear power plant. The importance of such a presentation is twofold. We could easily argue, as have some business journalists, that the failure of the U.S. nuclear program ranks as the largest managerial disaster in U.S. business history (Cook, 1985). On those grounds alone, any case study shedding light on such an important problem would be worthwhile. Second, as we have noted, the escalation area is in dire need of further grounded research. Not only was the only existing case study (Expo 86) used to derive rather than test the temporal model of escalation; some unique aspects of that case may constrain its generality. Expo was a self-terminating construction project, ending by design after the summer of 1986. Therefore, it was impossible to study the dismantling of an ongoing project or course of action using Expo 86. Since escalation research is as much concerned with how organizations get out of losing courses of action as with how those courses expand over time, it is important to examine projects that are not self-terminating. LILCO's Shoreham Nuclear Power Plant constitutes such a case.

THE SHOREHAM CASE

Theory Testing Versus Theory Building

In the literature on organizations, case studies are typically considered a forum for theory construction rather than testing. Therefore, case researchers are often cautioned either to come to the field without preconceived hypotheses (Schwartz & Jacobs, 1979) or to cycle continually between data and theory (Glaser & Strauss, 1967). In contrast, other social sciences use single and comparative case studies as a principal means of theory testing, with the corresponding caveat that hypotheses be stated up front (Bryman, 1988).

In the Shoreham case, we engaged in both theory testing and theory building. We came armed, up front, with the temporal theory derived from earlier research, seeking to test the generality of our two stated propositions. However, as noted above, we also came to the Shoreham study with a certain degree of skepticism about the generalizability of the temporal model. In addition, because the *a priori* model was not designed to explain the exit of organizations from escalation situations, we hoped to use the Shoreham case to build new theory on organizational exit.

For the theory-testing part of this research, we used a variant of qualitative pattern matching between theory and data. As Campbell (1975) and Yin (1989) noted, pattern matching can be performed using variation on either dependent or independent variables. For example, when a set of nonequivalent dependent variables is predicted and found to result from a particular treatment or process, an investigator can be relatively confident that such an effect has indeed occurred. Likewise, if a consequence is predicted and found to result from a particular array of nonequivalent independent variables, a strong inference can similarly be made.

In the Shoreham case, the dependent variable constituted an increasing expenditure of resources for a nuclear reactor that was never placed into operation. Our test of Propositions 1 and 2 consisted of finding out whether the hypothesized set of independent variables was present before and during the escalation of commitment at Shoreham and whether those independent variables were indeed ordered as shown in Figure 1. Thus, the theory-testing part of this case study used pattern matching on nonequivalent independent variables in testing the propositions.

A more fluid form of pattern matching was also used to build theory about the exit of organizations from escalation situations. We not only examined archival and interview data to discern their fit with the *a priori* hypotheses, but also used those sources of information to derive an understanding of organizational escalation and exit not necessarily predicted in advance. As Glaser and Strauss (1967) and Elsbach and Sutton (1992) recommended, we used a less linear approach with the theory-building aspect of the study, moving back and forth between the empirical data and possible theoretical conceptualizations. Our goal was to comprehend as fully as we

could the events of Shoreham and to match those events with potential models of escalation and exit.

Data Sources and Methods

To begin our study of the Shoreham case we first consulted published reports on the plant and LILCO. This was no small task since the Shoreham case was a major financial disaster chronicled in detail by the popular press. One reason for this heavy reporting was the plant's location on Long Island, close to the media center of New York City. We therefore consulted hundreds of articles on Shoreham published by the *New York Times* (specific citations appear in the case description); numerous articles in the *Wall Street Journal* (e.g., 1977, 1979, 1982, 1983, 1984a, 1984b, 1985a, 1985b, 1986, 1987, 1988, 1989a, 1989b); reports published in other national periodicals (e.g., *Nation*, 1986; *National Review*, 1988; *Nature*, 1987); a detailed book on LILCO (Grossman, 1986); more general books on the U.S. nuclear industry (e.g., Ford, 1986; Komonoff, 1982; Pringel & Spiegelman, 1981); and numerous pamphlets, memoranda, and internal LILCO documents not generally available to the public. The first author examined all the material and sent photocopies of the most important pieces to the second author. Site visits to the plant and the village of Shoreham soon followed.

In the initial site visit, the Shoreham-Wadding River Public Library was used to obtain further material on the nuclear plant. The library contained a wealth of unpublished documents from court and administrative hearings relevant to the licensing of the Shoreham plant. A second visit was then scheduled to interview participants in the Shoreham case and informed observers. Interviews were arranged with individuals who were either frequently mentioned in published reports about Shoreham or were authors of major accounts of the nuclear plant. These included both LILCO spokespeople and individuals who were long-time opponents of Shoreham. At the end of the sessions, interviewees were asked to suggest other individuals who would be important sources for understanding the events of Shoreham. There was a high degree of consensus among both LILCO advocates and opponents about who were important actors in the situation. Twenty-one individuals were subsequently telephoned and told that we were gathering information for an academic article on the Shoreham plant. Of the 21 individuals, 4 declined to be interviewed, 2 without specifying why, 1 because he was involved in his own writing project related to Shoreham, and 1 because he could not be scheduled for an interview. Of the remaining 17 sources, 9 were interviewed in person and 8 were interviewed exclusively by telephone. The interviews averaged about one and a half hours in length, ranging from 20 minutes to four hours.

The focus of the interviews was the person's own experience with the Shoreham project. The interviews were primarily open ended but always included some of the same general questions; examples are "When did you become involved in the Shoreham controversy?" "What was the nature of your involvement?" "Was Shoreham initially a good idea?" "When, if at all,

did it stop being a good idea?" "Why did Shoreham end up costing so much?" "What led LILCO to continue with the plant?" Some specific questions asked of many, but not all, participants included the following: "Did it matter who was in charge of LILCO?" "What role did the federal government play in Shoreham?" and "What do you think about the agreement to dismantle Shoreham?" At the end of the sessions, interviewees were asked, "Who disagrees with you about this?" in order to check on the representativeness of our coverage of Shoreham. Although there was a set of prepared questions for each interview, the material discussed invariably stretched beyond these initial inquiries. The goal of the interviews was to assist us in formulating a detailed history of the Shoreham decision, as perceived by the informant. Although occasionally we wished to discuss specific incidents or issues with particular informants, the general focus was on understanding the decision context and the historical unfolding of events. One individual requested the interview be kept "on background," and others at various points requested that some specific comment or speculation be off the record. Such concerns were rare but have of course been honored in the account that follows.

Written notes were taken during each of the interviews, which were conducted by the first author. We then worked together in combining interview material, background documents, and the extensive published information to produce an outline of the events of the Shoreham case. Next, we compared Shoreham to the *a priori* model. For each of the determinants of the temporal model, we discussed whether particular variables were present in the Shoreham case, how important they were, and when they were of importance. This pattern fitting was made easier by the multitude of data on Shoreham. In fact, we only drew conclusions about a determinant of escalation if evidence from multiple sources pointed to such an inference; for instance, numerous articles and interviewees mentioned the psychological commitment of the former chief executive of LILCO. Thus, the reader should keep in mind that when a quotation is provided for interpretation of the case, it illustrates that further evidence was available.

Although many of the *a priori* determinants appeared to be present in the Shoreham case, several new elements also emerged from the interviews and written accounts of the plant. This was especially true concerning the broader contextual determinants of escalation and the process of organizational exit. For these new topics, we moved back and forth between our data and new conceptual categories in an effort to form grounded theory (Glaser & Strauss, 1967). In formulating theory on organizational exit, we also gathered new data from follow-up interviews, conducted via telephone, and additional business press articles on the most recent events at Shoreham.

For several reasons, the Shoreham case allowed us to make inferences that are relatively strong, in a logical rather than a statistical sense. First, the dependent variable was not an ephemeral phenomenon, like variables such as values or organizational culture so often studied by qualitative research. Instead, there was a physical structure that cost \$5 billion—one that would

eventually be decommissioned without ever having begun operation. Second, the basic facts of the Shoreham case are objectively verifiable. Although the nuclear plant has generated enormous political controversy, the size of Shoreham's losses (see Table 1) and the set of events leading up to this disaster are not themselves in dispute. Finally, evidence on the independent variables, the determinants of escalation, was assembled from multiple sources, many of whom were arms-length observers of the phenomenon. Unlike most case studies, this report does not rely solely on the researchers' field notes or interpretations, since readers can consult the many publicly available reports on Shoreham.

The description that follows is a summary of the events that occurred from Shoreham's inception to its closing. Although this summary is incomplete because of space limitations, it does include the major elements of the story. The reader is warned that we will not subsequently interpret every event of our Shoreham description, since no theoretical framework can hope to explain more than a portion of a complex history spanning many years. Highly abbreviated case studies may sometimes give the impression that a total explanation is possible, since many events not fitting a particular theoretical model are left out of the description. In the following description, we try to retain some of Shoreham's natural complexity. Although we have only cited coverage by the *New York Times* for each major phase of the Shoreham project, the case description is based on the full range of data sources available to us.

TABLE 1
Selected Cost Estimates for the Shoreham Nuclear Power Plant

Date	Cost Estimate	Projected Completion and Operation
April 14, 1966	\$65-75 million	1973
September 20, 1970	250 million	1975
December 19, 1971	271 million	1977
December 5, 1972	350 million	1977
April 1, 1973	506 million	1978
April 1, 1974	695 million	1978
April 1, 1976	969 million	1978
March 7, 1979	1.3 billion	End of 1980
June 4, 1979	1.5 billion	December 1981
April 15, 1980	2.2 billion	Late 1982
December 27, 1981	2.5 billion	1983
November 4, 1982	3.1 billion	1983
November 28, 1983	4.0 billion	Complete but not ready
February 24, 1984	4.1 billion	July 1985
June 1, 1985	4.3 billion	October 1985
November 11, 1985	4.5 billion	
September 20, 1987	4.6 billion	
December 13, 1987	5.0 billion	
March 18, 1988	5.2 billion	
March 1, 1989	5.5 billion	Agreement to abandon

A BRIEF HISTORY OF THE SHOREHAM PLANT

A Modest Proposal

On April 13, 1966, the Long Island Lighting Company announced plans to construct a nuclear facility in Shoreham, New York, a small town 55 miles east of Manhattan. It was anticipated that construction of the plant would begin in late 1969, with service beginning in 1973. The plant was to cost between \$65 and \$75 million to construct and would have a capacity of 540 megawatts. Initial local reaction to the Shoreham proposal was quiet and modestly favorable (*New York Times*, 1966).

In 1967, LILCO announced plans for an additional nuclear facility to be constructed in Lloyd Harbor, another Long Island town, and received quite a different response. Local residents organized and formed a research and lobbying group, the Lloyd Harbor Study Group, in opposition to the nuclear plant. Although LILCO let the Lloyd Harbor project drop and turned its attention to Shoreham, the newly organized and adamantly antinuclear group also turned its attention to Shoreham.

Early Resistance

In 1969, LILCO changed the design of the Shoreham plant from a projected capacity of 540 megawatts to 820 megawatts on the basis of anticipated energy demand and economies of scale. The plant cost estimate was raised to \$261 million, and the completion date was pushed to 1975.

Public hearings on the Shoreham project began in March 1970 and lasted nearly three years. These hearings were a prerequisite to the project's licensing by the U.S. Atomic Energy Commission (AEC). Opponents called dozens of witnesses and raised a wide range of concerns about the plant. By comparison, two similar AEC application processes a year earlier in Oregon and Tennessee had lasted only three and four days respectively. In the end, the AEC recommended that LILCO be allowed to construct the Shoreham facility. But by the time the Shoreham construction permit was finally granted, on April 13, 1973, LILCO had already spent \$77 million on preparations and obtaining approval for the plants—more than the original estimate of the entire cost of construction (Grossman, 1986: 130).

Construction Begins

With the granting of the construction permit, much of the intense opposition to Shoreham quieted. The years 1973 through 1975 saw little publicly reported conflict at Shoreham. Construction at the plant moved along, and to outside observers all was calm. Although the national debate about the costs and benefits of nuclear power continued in the press (*New York Times*, 1976a), nuclear power was still reasonably popular among the public at large. For example, in 1976 voting on a statewide proposal, "Proposition 15," California residents were more than two to one against limiting construction of nuclear plants (*New York Times*, 1976b). LILCO also conducted

polls showing local residents favoring nuclear power, with the level of support declining only slightly from 1975 to 1976 (*New York Times*, 1977a).

Although LILCO and Shoreham appeared to be more than holding their own in the battle for public legitimacy, serious substantive problems were starting to appear at the Shoreham plant. On September 21, 1977, the New York State Public Service Commission announced plans to study how LILCO was managing Shoreham construction. The investigation was prompted by the soaring costs of Shoreham, which had by then surpassed \$1 billion. "The plant will probably be the most expensive, in dollars per kilowatt, ever built," noted one observer (*New York Times*, 1977b).

The source of this budget explosion was subject to dispute. A 1977 report suggested that \$181 million of the cost overruns was attributable to new regulatory requirements. An August 8, 1978, newspaper column by the project manager of Shoreham linked the rising costs to the "intervention of anti-nuclear 'gadflies' and the continuing growth of regulations" (*New York Times*, 1978). However, a 1977 study carried out by Booz Allen & Hamilton consulting firm showed that the average worker at Shoreham was spending only 20 percent of each seven-hour day performing his or her trade. LILCO management attributed the cost overruns to the "dilatatory and antisocial actions" of environmental interests, but several areas of cost appeared to be traceable to "LILCO mismanagement" (*New York Times*, 1979a). By early March 1979, the plant's scheduled date of operation was pushed back to the end of 1980, and its estimated cost rose to \$1.3 billion.

On March 28, 1979, the Three Mile Island nuclear facility in Pennsylvania experienced a major nuclear accident. The effect of Three Mile Island on Shoreham would prove to be substantial. The antinuclear movement was again directed against Shoreham, and on June 4, 1979, a massive demonstration took place outside the construction site. Over 15,000 people participated, and over 600 demonstrators were arrested (*New York Times*, 1979b).

LILCO's financial situation was already difficult at this point in the construction of Shoreham. But in April 1979 it worsened, as the New York State Public Service Commission refused to grant the utility a rate increase to cover \$400 million spent on Shoreham (*New York Times*, 1979c). Moody's Investor Service also lowered LILCO's rating because of Shoreham.

During 1979, further delays in the construction of Shoreham were announced. Although the 820-megawatt facility was now estimated to be 80 percent completed, new delays moved back the estimated completion date to December 1981. An additional problem LILCO faced was that Nuclear Regulatory Commission (NRC) officials were now so busy working at Three Mile Island that they simply didn't have time to finish their work at Shoreham (*New York Times*, 1979d).

On April 15, 1980, LILCO again pushed back the announced opening of Shoreham, this time by about 20 months, to late 1982 or early 1983. The company also raised the projected cost of the plant from \$1.6 billion to \$2.2 billion.

One analyst described LILCO as "sort of like a heroin addict," adding

"You have to keep pumping in money." LILCO had been feeding its habit not only by borrowing but also by cutting back on customer service and maintenance (*New York Times*, 1980). As one interviewee stated, "They didn't give a damn about providing service; all they wanted was to build their plant." Critics continued to suggest alternatives such as conservation as a means of meeting Long Island's energy needs.

The End of the Tunnel?

Despite the massive cost overruns, LILCO's tenuous financial situation, and growing popular opposition to nuclear power, the construction of Shoreham continued and indeed neared completion. On May 10, 1981, LILCO's chairman of the board, Charles Pierce, stated, "The end of the tunnel is truly in sight" (*New York Times*, 1981a). However, that same month, Suffolk County began examining its emergency preparedness plan, a plan that had to be in place before Shoreham could begin operations. The plant's proponents said the plan would never be needed. Opponents said it would never work (*New York Times*, 1981b).

A Growing Awareness of Error

The Shoreham budget and completion date were again revised on November 4, 1982. This estimate was \$3.1 billion total cost and a September 1983 opening. As noted in the *New York Times* (1983a), the Shoreham plant was conceived when oil was \$1.80 a barrel, yet the reactor was supposed to provide even cheaper energy than oil. Now oil was over \$30 a barrel, but because of the plant's enormous construction costs, electricity from Shoreham would be three times as expensive as the electricity produced by plants that were oil-burning. "If we had known that we were talking about a \$3 billion plant and all the other travail that has gone along the way—the licensing, the political problems—I think we might have chosen not to," said a LILCO spokesman. "It's obviously proven to be the fact that we were overconfident" (*New York Times*, 1983a).

In February 1983, Suffolk County officials asked the NRC to hold hearings because no plan had been approved for the evacuation of local residents in the event of a nuclear accident (*New York Times*, 1983b). This request came against a backdrop of growing local and state resistance to Shoreham. For example, in a debate between LILCO chairman Charles Pierce and the Suffolk County executive, Peter Cohalan, Pierce argued that the evacuation of the area around the plant was feasible and that in any case an accident serious enough to warrant an evacuation would only occur "once in 500 million years." Cohalan stated, "I think they all wish the Shoreham plant to go on line because of their own personal involvement in many years of working with that plant, and also if it were not to go on line, the present management of LILCO might be replaced" (*New York Times*, 1983c).

By late 1983, some consensus had emerged. Many early proponents of Shoreham as well as numerous company officials had come to agree with opponents of the project that it had been a mistake to build the plant. A

typical comment was, "We've got a \$3.5 billion white elephant—or at least white to a large extent." Another was, "It doesn't matter whether it runs or doesn't run. Most of what we are doing is damage control" (*New York Times*, 1983d).

On January 31, 1984, Charles Pierce resigned. In reaction to Pierce's resignation, many observers felt that his tough stance had eliminated the possibility of settling the Shoreham issue. One analyst stated, "If they had done this five years ago, it probably would have been a very good move. I think the company had suffered a kind of insularity, where everybody in a top managerial position throughout the whole Shoreham episode had been with the company and only with the company for a very long period of time" (*New York Times*, 1984a). On February 9, 1984, the new CEO of LILCO, William Catacosinos, called the Shoreham plant a mistake and indicated that LILCO was considering abandoning it, although he went on to state that, because of the enormous investment already made in Shoreham, the company's goal was still to open the plant (*New York Times*, 1984b). As one of our interviewees stated, "With Catacosinos it was back to more of a business approach. It wasn't personal. Catacosinos was much more pragmatic."

On February 24, 1984, the company again raised Shoreham's estimated cost and lengthened the time until completion. The plant was now estimated to cost \$4.1 billion and was expected to go into operation July 1, 1985 (*New York Times*, 1984c).

Complete but Not Ready

On March 18, 1984, it was announced that the Shoreham plant was complete but that it would take a year or more to begin operations (*New York Times*, 1984d). This time was required for fuel loading and start-up testing. The testing process involved sequences at 0, 5, 10, and 100 percent operation. Each phase required NRC approval.

Although the plant was complete, opposition to its operation had not ended. New York State and Suffolk County still refused to participate in the required emergency planning. However, as 1984 ended, Shoreham reached a crucial point. When a reactor construction project is discontinued, its parts are usually sold as spares or for scrap, with the salvage value running in the \$100 million range. In contrast, when a previously operated reactor is shut down, it has no salvage value but instead represents a substantial liability due to the costs of decontamination. Thus, some observers felt that if LILCO began low-power testing, it could create an "inevitability factor." The swing in cost would be at least \$200 million.

On January 20, 1985, fuel loading at Shoreham was completed and 1 percent testing was approved. LILCO immediately sought permission to increase testing to the 5 percent level (*New York Times*, 1985a).

On March 31, 1985, it was revealed that despite President Reagan's promise of federal neutrality, the United States Department of Energy had been working behind the scenes to assist in Shoreham's licensing. For example, one internal memorandum stated, "The investment community

needs to see a clear path to final licensing to justify taking the risks of nuclear power" (New York Times, 1985b). Another U.S. Department of Energy document stated, "A major concern on Long Island is the ability to evacuate residents. In fact these problems are not real because the risk is so small" (New York Times, 1985b).

On June 1, 1985, Suffolk County's Executive Cohalan revised his public position and ordered county employees to participate in the evacuation drill, and LILCO immediately paid the county \$131 million in back taxes on the plant. Supporters of Shoreham were ecstatic. Of course there were also broader implications of Shoreham's status for the nuclear power industry in general. As a LILCO vice president stated, "To a great extent, as Shoreham goes, so goes the nuclear industry" (New York Times, 1985c).

As Shoreham Goes . . .

On July 8, 1985, a 5 percent operating permit was granted (New York Times, 1985d). By mid-November, the 5 percent power testing at the plant was completed, and it seemed that only some major catastrophe could prevent Shoreham from coming on line with full operation. That catastrophe took place at Chernobyl, in the Soviet Union, on April 25, 1986.

One of LILCO's prime arguments for Shoreham was that life-threatening accidents, the kind that did major damage to the surrounding community, were so rare as to be purely hypothetical. After April 25, 1986, that was no longer true. The Chernobyl tragedy provided a major push to Shoreham opponents at a time when their defeat seemed almost certain (New York Times, 1986a).

Suffolk County increased its already strong resistance to the project. On June 1, 1986, the county filed a lawsuit charging that LILCO had lied about escalating costs for the Shoreham nuclear power plant and that it had concealed design and construction defects (New York Times, 1986b).

By early 1987, it was clear that Shoreham's licensing dispute was fundamentally an issue of states' rights. If the state and local governments refused to participate in evacuation plans, as they did in the case of Shoreham, could the federal government overrule them? It seemed likely the issue would be decided in the United States Supreme Court (New York Times, 1987).

The Decision to Close Shoreham

On May 12, 1988, LILCO reached agreement in principle with the state of New York to close Shoreham. LILCO would turn the \$5.3 billion plant over to the state in return for rate increases and a \$2.5 billion tax write-off (New York Times, 1988a). As might be expected, reactions to the proposed transfer were mixed. Some saw the settlement as far too generous to LILCO, and others were concerned about the damage to the U.S. nuclear industry if Shoreham were allowed to be permanently decommissioned. Not surprisingly, many in the New York legislature did not want to be associated with either the closing of the plant or the rate increases required by the pact.

Meanwhile, LILCO moved ahead on a second front, continuing the attempt to obtain licensing for Shoreham. On November 19, 1988, President Reagan issued an executive order under which the Federal Emergency Management Agency could adopt emergency plans if a state or locality refused to participate in such planning efforts (*New York Times*, 1988b). However, LILCO received still another major setback when a federal jury found LILCO guilty of deceiving New York State in obtaining past rate increases. The jury's decision created the possibility of massive class action suits against LILCO. Thus, as 1988 ended there was renewed movement toward licensing, the specter of class action lawsuits, and a shaky agreement with the state for abandonment.

On March 1, 1989, New York's Governor Cuomo reversed his earlier position requiring legislative endorsement of the Shoreham pact. He signed an agreement with LILCO to close the \$5.5 billion plant, without even receiving legislative approval (*New York Times*, 1989a). Ironically, on April 20, the NRC finally granted full operating power to the utility. Nevertheless, LILCO's position was that it would honor its earlier agreement with the state.

A Rearguard Action

Throughout both 1989 and 1990, the federal government under President Bush remained dedicated to doing everything possible to keep Shoreham from being dismantled. A U.S. Department of Energy official stated, "We intend to throw up every roadblock we can. And if we have to create some, we'll do so" (*New York Times*, 1989b). In July 1989, for example, the federal government requested the NRC to provide an assessment of the environmental impact of closing Shoreham, knowing that such an assessment could take months or even years to complete (*New York Times*, 1989c). An interest group called "Scientists and Engineers for Secure Energy," including six Nobel laureates, also promised to challenge Shoreham's closing in New York State courts. During these efforts to prevent the dismantling of Shoreham, LILCO was at times a silent observer.

In October 1990, the NRC ruled that "LILCO is legally entitled under the Atomic Energy Act and our regulations to make, without any NRC approval, an irrevocable decision not to operate Shoreham" (*New York Times*, 1990). Not giving up, the Department of Justice filed suit in July 1991, again asking for an environmental review of Shoreham's closing. However, on July 19, 1991, a federal appeals court ruled that Shoreham could be dismantled without conducting an environmental impact study (*New York Times*, 1991a). On August 1, 1991, the U.S. Supreme Court refused to overturn this decision (*New York Times*, 1991b).

Several other lawsuits are still pending, but it now appears that the Shoreham story is finally over. Although some groups still hope for the facility to operate, the steps currently being taken to decommission the plant will be difficult to reverse. And regardless of the plant's future, the basic outline of the history of Shoreham's construction remains clear. A nuclear plant initially estimated to cost \$65–75 million ended up costing over \$5

billion to complete. Despite an array of negative feedback, LILCO sustained its decision to continue with Shoreham for more than 20 years, a clear-cut case of commitment to a losing course of action.

ESCALATION DETERMINANTS

As we have noted in earlier writing (Staw & Ross, 1987), it is possible to group the determinants of escalation into four broad categories. In the following sections, we will examine how previously identified escalation determinants may apply or need to be revised in the light of the Shoreham experience. We do not attempt to categorize each and every event in the over-20-year history of this multibillion dollar project but instead place the major occurrences into a theoretical framework.

Project Determinants

Certainly a major group of determinants for the Shoreham nuclear plant involved objective features of the project itself. Five project variables we examined were the ambiguity of economic data, the sequencing of the projects' costs and benefits, the categorization of Shoreham as a long-term investment, the salvage value and closing costs for Shoreham, and finally, the overall size of the project. We consider each project determinant briefly below.

First, assessing the economic prospects for Shoreham involved the simultaneous estimate of many completely exogenous variables decades into the future. These included the price and availability of oil, the price and availability of alternative energy sources, such as coal, the long-term energy demand on Long Island, the cost of capital, the operating capacity and life of an 800-megawatt nuclear plant (the first in existence), and the cost of coping with changing governmental regulations and external pressure groups. Estimates on these many economic components fluctuated widely over the entire life of the project among both the supporters and the opponents of Shoreham as well as among neutral observers of the situation. Unfortunately, as Northcraft and Neale (1986) showed, clear and salient financial information may be necessary for decision makers to withdraw from a losing course of action. Thus, not being able to estimate Shoreham's costs and benefits within normal ranges of confidence probably made it difficult for policy makers to draw a firm line for withdrawal.

The sequencing of rewards and costs may also have acted against withdrawal from the course of action. As can be seen from Table 1, the cost estimates for Shoreham rose almost exponentially. However, although costs continually increased, the dollar value of each increase was a relatively small percentage of previous expenditures. In addition, most of the expenditures took place when the plant was already 80 percent completed, with a large percentage of subsequent costs the result of responses to governmental regulations and delays in operational licensing. Recent research on the effects of sunk costs (Arkes & Blumer, 1985; Garland, 1990) suggests that

having a nearly complete physical structure probably increased the willingness of LILCO to invest additional funds.

The initial categorization of Shoreham as a long-term investment probably also affected how feedback on the project was interpreted. As we have noted (Staw & Ross, 1987), with long-term investments initial losses are accepted as the price of subsequent returns. In the case of Shoreham, even the most enthusiastic backers of the nuclear plant felt that the payback period might be ten years from the date of completion. Therefore, when construction costs rose and the completion date receded, the impact on proponents in terms of monitoring vigilance or thoughts of discontinuance was probably less than would have been the case with a shorter-term endeavor.

Following Northcraft and Wolf (1984), we should also note that salvage value and closing costs may have influenced Shoreham's construction. The salvage or conversion value of Shoreham was never very high, the most positive pre-1985 estimate being in the \$10–100 million range. However, after the plant underwent its 5 percent testing, not only was there no salvage value, but a very high cost of decommissioning the facility was incurred. Testing raised the costs of withdrawal at least \$200 million: \$70 million for the partially used fuel itself and the remainder for decontamination.

A final but perhaps compelling factor in the decision to persist with Shoreham was the project's sheer size. As a greater and greater percentage of LILCO's assets were tied to Shoreham, the facility and the future of the utility became intertwined. The project turned into a "bet-the-company" proposition. By 1984, it was clear that the facility faced tremendous roadblocks to ever opening and should probably be abandoned. Yet, as a LILCO spokesperson said in one of our interviews, "To abandon was to declare bankruptcy, and the new leadership of the organization was unwilling to do that."

Psychological Determinants

As Platt (1973) and March (1978) argued, those who have advanced to top leadership positions may be prone to reinforcement traps, situations in which people assume, because of their histories of success, that losing courses of action will turn around. The leaders of LILCO probably were no exceptions. LILCO's head, Charles Pierce, for example, joined LILCO's legal department in 1949, rose steadily through the corporation's ranks, became secretary in 1962, vice president in 1966, senior vice president in 1969, president in 1974, and chairman in 1978. With such a personal reinforcement history, it may have been difficult for him to conceive of a course of action not eventually being successful.

A second set of psychological factors that may have influenced escalation at Shoreham were errors in information processing. As Nisbett and Ross (1980) summarized, people have an almost uncanny ability to bias facts in the direction of previously accepted beliefs and preferences. In a similar manner, LILCO decision makers' estimates of the future demand for energy and the possibility of energy blackouts were vastly overstated; their esti-

mates of the cost and completion date for Shoreham were invariably optimistic; and their estimates of the benefits of Shoreham were greater than those provided by observers in virtually every case. In our interviews, officials of the firm admitted that, in retrospect, they had been far too confident.

A related information-processing error was failing to properly isolate the causes of failure for the Shoreham decision. Individuals' responses to negative feedback can depend on whether they believe endogenous or exogenous factors have caused a setback (Staw & Ross, 1978). And, as research on self-serving biases has repeatedly documented, people are much more likely to attribute negative outcomes to external than to internal causes (e.g., Miller & Ross, 1975; Nisbett & Ross, 1980; Staw, McKechnie, & Puffer, 1983). In the Shoreham case, there is much evidence to suggest that decision makers saw the failing decision not so much a product of their own faulty calculus or lack of management as the result of intervention by external regulators and "anti-social elements." This was a recurring theme in LILCO's advertising and in public statements by company officials. Thus, the impact of negative feedback coupled with its attribution to illegitimate external sources may have impeded decision makers' objective examination of Shoreham's prospects and reduced the likelihood of withdrawal.

Social Determinants

Social determinants associated with escalation were also present in the Shoreham case. Two closely related factors were external justification and social binding.

External justification involves the need for decision makers to rationalize their actions to other parties. As Fox and Staw (1979) showed, external justification effects are particularly strong among those who are politically vulnerable or whose initial policy choice has met with resistance. In constructing Shoreham, LILCO's management continually faced the need to assure external constituencies, such as shareholders and the public utilities commission, that its investment was a wise one. Indeed, some estimates provided by LILCO were so wide of the mark that the utility found itself indicted for fraud by Suffolk County and New York State authorities. It seemed that as the management of LILCO's commitment to Shoreham was challenged, each challenge was met with renewed justification, only serving to further increase commitment to Shoreham.

LILCO's management may also have become increasingly committed as it became personally identified with Shoreham. As Salancik (1977) noted in his theory of commitment, the binding of decision makers to a course of action is especially likely to occur when advocacy is public, explicit, high in volition, and repeated. Interestingly, all these conditions were present in the Shoreham situation. For example, LILCO's chairman repeatedly spoke out in favor of the project, not only acting as company representative in routine functions, but also personally appearing in many of LILCO's advertisements promoting the plant. In a sense, the executives linked to Shoreham had staked both their jobs and their reputations on continuation of the project.

Two additional social variables that may have contributed to persistence in the Shoreham case were norms of consistency and modeling.

Norms of consistency have been shown to influence how leaders are evaluated (Staw & Ross, 1980). American society reserves special praise and admiration for those who stay a course in the face of hardship, only to triumph in the end. The idea of consistent leadership was a recurrent theme and promised source of vindication in LILCO's pronouncements. Even as late as 1982, LILCO officials stated, "If people will just wait until the end, they are going to realize that this is a hell of an investment."

Modeling may also have been influential in the Shoreham case. Since the complexities of plant construction prevented reliance on objective analysis, officials at Shoreham seemed to rely on socially derived information (Brockner et al., 1984). LILCO was one of the few major utilities in the United States not to have a nuclear power component. And a repeated source of annoyance to LILCO officials was the fact that other nuclear facilities, conceived and begun at the same time as Shoreham, were rapidly constructed and operating successfully. In fact, there had never been a single instance of the AEC or NRC refusing to license a plant once it was constructed. These social comparisons likely increased the confidence of LILCO management that, eventually, Shoreham would be allowed to begin operation.

Organizational Determinants

In addition to the project, psychological, and social variables considered here, several organizational determinants also appeared to contribute to LILCO's continuing the Shoreham project. We consider in particular the role of technical side-bets, political support, and institutionalization.

The decision to embark on the construction of a nuclear power plant involved far more of an investment than simply the plant construction itself. It involved hiring planners, operators, a technical support staff, and a variety of other people, all of whose primary asset was expertise with nuclear power. The presence of these individuals tended to both frame the way new information was viewed and constrain the options considered. Increasingly, the company placed all its hopes in the nuclear basket, forgoing routine maintenance on existing facilities, such as tree trimming or moving power lines underground, so that more funds would be available to invest in Shoreham. LILCO ignored conventional power plants with known costs and benefits and instead plowed more money into Shoreham. Over time, LILCO wasn't merely investing in Shoreham as a part of its energy program: Shoreham was LILCO's energy program.

Originally LILCO had planned to build not one but several nuclear power plants on Long Island. The aim was to capitalize on the organization's access to the massive water cooling supplies of the Atlantic Ocean and to become a major energy wholesaler. When local resistance mounted and the company suffered defeats in Lloyd Harbor and Jamesport, only Shoreham remained of what one of our interviewees called "LILCO's sense of manifest destiny in energy production." Thus, the linkage of Shoreham to LILCO's

strategic corporate vision likely contributed to the utility's difficulty in abandoning the nuclear plant.

Contextual Determinants

Though contextual determinants were not an explicit part of our *a priori* model, Shoreham illustrated their importance. In the Shoreham case, the decision to construct a nuclear plant became larger than the organization itself, involving forces beyond the organization's boundaries. In addition to the nuclear power constituency created inside LILCO, a range of external political parties influenced Shoreham. These included other public utilities interested in nuclear power, representatives of the nuclear power industry, and those in the federal government pushing for the development of nuclear power. The role of these external parties and their alliances with LILCO cannot be overemphasized. Grossman noted, "Of all the U.S. utilities, none has had closer ties with this [nuclear] establishment than LILCO. LILCO's location was in the middle of the area where the U.S. government, after the war, set up a key facility to develop nonmilitary uses of nuclear technology—Brookhaven National Laboratory" (1986: 167). LILCO wedded itself to this nuclear establishment as it sought to overcome resistance to the completion and operation of Shoreham. It is worth noting that even as late as 1990, these external forces continued to push for Shoreham's operation, although LILCO itself had agreed to abandon the facility. Both the Department of Energy and various citizens' lobbying groups were still engaged in a variety of actions to prevent Shoreham's decommissioning. In effect, these groups could be seen as attempting to convert LILCO into a "permanently failing organization" (Meyer & Zucker, 1989). From the perspective of these external groups, persistence with Shoreham was far more of a concern than LILCO's performance.

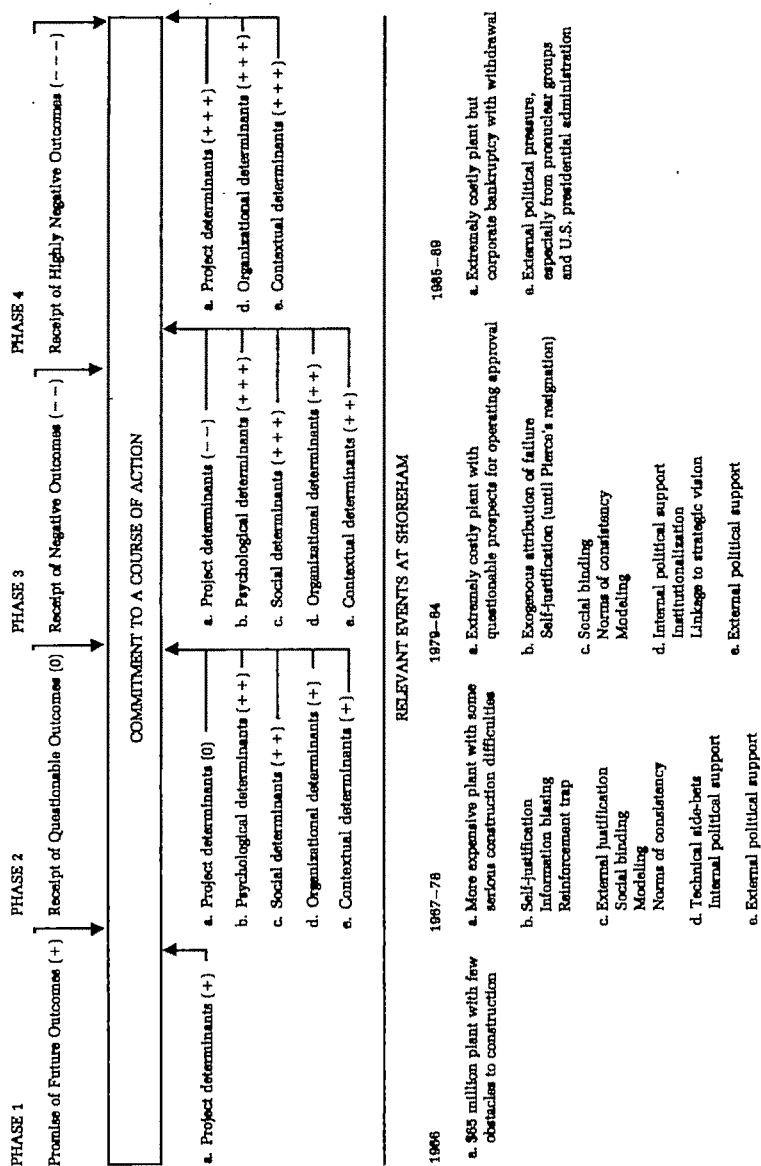
A Summary Model of the Shoreham Decision

Figure 2 summarizes the most important influences in the Shoreham case.

When LILCO first decided to build the Shoreham plant, in 1966, project variables appeared quite favorable. Future nuclear fuel costs promised to be much lower than those of oil and, as proponents of the plant pointed out, there had never been a serious nuclear accident. Therefore, as with other projects at their inception, commitment was at first driven by what seemed to be objectively positive economic criteria.

The second stage of the Shoreham project (1967–78) involved the many years in which public hearings were held to obtain a construction permit as well as the start of construction itself. During this period, the project variables grew somewhat less positive, as delays and changes in design increased the project's cost, with the result being that the relative advantage of Shoreham over other sources of energy declined. However, any decreases in the attractiveness of the project were probably more than offset by increases in psychological and social sources of commitment. As noted, LILCO's man-

FIGURE 2
Stages of the Escalation at Shoreham^a



^a The pluses, zeroes, and minuses represent our evaluation of how much and in what direction each of the various determinants contributed to commitment to the course of action. Through these values are approximations, they are intended to indicate how each determinant's strength tends to vary over time.

agement tended to bias the information about Shoreham in a positive direction and to otherwise justify their previous decisions on the project. In addition, repeated demands to defend the project with various external constituents, such as stockholders, utility commissions, and licensing agencies, may have also contributed to commitment on the part of LILCO's management to Shoreham. By the end of 1978, negative news about the economics of the project had steadily accumulated, but there was still sufficient ambiguity about its value and strong enough countervailing forces for LILCO to maintain commitment to the course of action.

A major difference between the Shoreham case and previous research and theory on organizational escalation was the early buildup of organizational and contextual influences. As noted earlier, Expo 86 was initially designed to be a self-terminating and relatively small-scale event organized by the province of British Columbia. Expo obviously grew in importance over time and, because of its escalation, came to be a central problem of the provincial government. Unlike Expo, however, Shoreham did not start as a small pilot project viewed by LILCO as peripheral or transitory. From the outset, Shoreham constituted a strategic effort to convert LILCO from a conventional utility to a more forward-looking high-technology enterprise. In addition, by building and seeking to operate a nuclear plant, LILCO hired a personnel vastly different from that needed to run coal- or oil-fired facilities. Once at LILCO, these specialized staff members not only constituted a major technological side-bet or sunk cost, because they could not easily be reassigned to other projects, but they also formed—along with those who hired them—a powerful political constituency within the company. At the same time as these internal forces for continuing Shoreham were building within LILCO, the company was also building alliances with external interest groups favoring nuclear power. Thus, organizational and contextual sources of commitment were both more evident and earlier occurring in the Shoreham case (shown in phase 2) than in previous research on escalation.

A third phase of Shoreham can be identified as occurring during the early 1980s. As Figure 2 shows, project variables turned distinctly negative at this time. However, although outside observers repeatedly called for the project's abandonment, LILCO's management still tried to defend the plant as a good investment. No doubt psychological and social variables served as a foundation for those optimistic forecasts, at least up until Charles Pierce's resignation in 1984. After Pierce's resignation, attempts to justify the original merits of the project diminished drastically. Instead, as the third phase of Shoreham ended, LILCO's commitment was defended as a way to recoup the billions of dollars of prior expenditure. To abandon Shoreham was tantamount to declaring bankruptcy, and LILCO's new leadership was unwilling to do that.

By the fourth phase of the Shoreham case (1985–89), the earlier psychological and social influences on commitment had been largely removed. However, at the same time, economic forces again started favoring continuation, as a grim reality became clear: either the plant would become opera-

tional or the company would collapse. In a manner reminiscent of the earlier Expo case (Ross & Staw, 1986), project variables had once again become a positive binding force late in the escalation cycle. In addition, contextual forces favoring continuation of Shoreham strengthened further. Pressure on LILCO from interested parties favoring continuation, ranging from the pro-nuclear lobby to the U.S. Department of Energy, mounted. However, unlike Expo, Shoreham had no fixed date for project termination. As a result, LILCO started to assume some of the features of a permanently failing organization (Meyer & Zucker, 1989), limping along to satisfy powerful internal and external constituencies.

CONCLUSIONS

Fit With the A Priori Model

Much like the Expo case, the Shoreham experience would seem to illustrate what we have earlier called an escalation prototype. As Table 1 and Figure 2 summarize, from 1966 until 1989 the Long Island Lighting Company's investment in the Shoreham Nuclear Power Plant rose from \$65 million to over \$5 billion. No one would have recommended construction if the original projected cost had been \$5 billion. Yet, over this 23-year period the company continued to increase its commitment and did so despite a steady flow of negative feedback. Thus, construction of the Shoreham nuclear plant provides a rather graphic example of organizational escalation.

Though the Shoreham case does not fit perfectly the a priori model, many of the same principles of escalation can be deduced from Figure 2 and the earlier model. First, it appears that negative results are more likely to be influential if they are clear-cut and come early in the escalation cycle. However, in the Shoreham case, as in other typical escalation episodes, results are either initially positive or ambiguous enough to delay judgment. And, by the time it is obvious that things have gone awry, other sources of commitment may have grown strong enough to hold an organization in its course of action. As noted, psychological, social, organizational, and even contextual forces built early in the Shoreham case, offsetting negative economic data. Later in the escalation cycle, even project variables became a salient source of commitment. Thus, the Shoreham case provides a clear-cut example of how difficult it is for economic results alone to prompt withdrawal from a losing course of action.

On a general level, the Shoreham experience appears to validate our first proposition, which predicts that a combination of psychological, project, social, and organizational determinants will determine organizational escalation. There also appeared to be partial support for our second proposition, which describes a temporal ordering of escalation determinants. As predicted, psychological and social variables were important at the beginning and middle phases of the escalation episode but did not appear influential at the final stage. Also as predicted, project variables were an important force for commitment at both the earliest and latest stages of the episode. How-

ever, in a manner neither our second proposition nor the a priori model in Figure 1 predicted, organizational determinants of escalation appeared as an early influence on Shoreham. Nuclear power became an important part of LILCO's long-term strategy and corporate identity at a relatively early phase of the episode. Moreover, contextual influences became a very powerful force in the Shoreham case in ways the a priori model did not anticipate. In the end, LILCO appeared at times to be almost a neutral observer, while external forces for and against Shoreham determined the fate of the nuclear plant.

Some New Propositions on Escalation

Several new propositions can be gleaned from the Shoreham case. First, we can predict not only that organizational determinants may come early in an escalation episode, but also that their early arrival increases the likelihood of a lengthy cycle of escalation. Thus,

Proposition 3: The earlier organizational determinants occur in an escalation episode, the more likely there will be long-term commitment to a course of action.

Similarly, it can be argued that when external constituencies become substantially involved in an escalation episode, the focal organization can actually lose control of the project it initiated. Contextual forces can turn the decision to stay or withdraw into a political rather than an economic or even organizational issue. Thus,

Proposition 4: The more external political forces become aligned with a project, the more difficult it will be for the initiating organization to withdraw from the course of action.

The particular project variables in the Shoreham case suggest two additional propositions. In the typical escalation episode, results are initially positive but turn distinctly negative as the episode continues over time. In the Shoreham case, even after the plant's construction costs had greatly inflated, it was still possible to estimate a net benefit, given sufficiently high estimates of long-run oil prices. Thus, project economics remained ambiguous for long enough for other variables (psychological, social, and organizational forces) to take hold as major determinants of commitment. Hence,

Proposition 5: The more ambiguous and changing the economics of a project, the more difficult it will be for an organization to extricate itself from the selected course of action.

Another project consideration with Shoreham was the sheer size of the venture relative to the total size of the firm. There seemed to be a crucial turning point in the Shoreham case when the nuclear plant moved from being a serious endeavor to a bet-the-company proposition. In fact, the point at which potential losses became so large that withdrawal was tantamount to

bankruptcy may have coincided with the time when project variables turned into a powerful late-stage influence on escalation. Thus,

Proposition 6: When the potential losses of a project become so large that withdrawal might lead to bankruptcy, an organization becomes increasingly committed to the losing endeavor.

As in the Expo case, one of the factors that seemed to influence Shoreham was a simple sunk costs effect (Arkes & Blumer, 1985; Garland, 1990), in which LILCO executives were unwilling to accept the fact that prior expenditures of resources may have served no purpose. In contrast, in research by Garland, Sandefur, and Rogers (1990), experienced oil industry managers seemed to be immune from the sunk costs effects often shown when business students and other laboratory subjects are studied. Perhaps those who work in occupations in which escalation is a routine problem may be socialized to avoid excess persistence; for instance, in the oil industry managers must often decide when to give up on drilling for oil in a dry hole. Likewise, organizations in which escalation is frequent may develop structural mechanisms, such as bank "work-out groups" (units whose sole function is to deal with nonperforming loans), to check escalation tendencies. On the other hand, when high-level executives pursue a major new initiative or a one-time activity like hosting a world's fair (Ross & Staw, 1986), they may not have the benefit of prior experience with similar losing courses of action, and as a result they may not be very adept at avoiding the trap of escalation (Ross & Staw, 1991). Interestingly, Shoreham was just such a new venture for LILCO, one for which prior learning was unavailable or seemingly inappropriate to the situation. Thus,

Proposition 7: Escalation problems are especially likely to occur when managers venture far from their areas of expertise or when technological changes cause such major changes in an organizational context that previously learned procedures and decision checks are no longer applicable.

Organizational Exit

As we noted at the outset of this article, prior research provided few theoretical leads about the exit of organizations from losing courses of action. Escalation research generally stops at the point at which an organization is still locked in a losing situation (see Simonson and Staw [1992] for a recent exception at the individual level of analysis). Of course, we have earlier posited that the exit of top executives, especially those associated with the origination of a project, can reduce psychological and social forces for commitment, thus making withdrawal more likely (Staw & Ross, 1987). We also noted that it may be possible for an organization to withdraw from a late-stage escalation episode by deinstitutionalizing a project—by separat-

ing it from the major goals and purposes of the organization, isolating it physically from the rest of the firm, or raising other activities to a more central position. Still, the emphasis of escalation research has been on understanding increases rather than decreases in commitment.

The typical assumption in the escalation literature is that organizations must choose between withdrawal from a losing project and remaining in the course of action, perhaps until bankruptcy or organizational death occurs. However, there is a middle ground between those extremes. As Meyer and Zucker (1989) noted, it is sometimes possible for an entity to become a permanently failing organization, continuing to survive in a negative situation, perhaps by absorbing resources from third parties or somehow generating enough revenue to offset continuing losses. Survival in such a negative state is possible to the extent that the organization has substantial reserves of capital and legitimacy; for example, General Motors' ability to absorb a long string of losses in the 1980s without substantial change. It is also possible for various constituents in its environment to prevent an organization from failing. In the Shoreham case, the U.S. Department of Energy worked hard to keep the nuclear plant alive because of its significance for national policy on nuclear power.

Therefore, we might hypothesize that, when there is not ready replacement for the services or products of an organization, external parties, including government, business, and consumer interests groups, will attempt to prevent the organization's withdrawal.

Proposition 8: When external constituents are successful in preventing the closing of a losing project or service, the unsuccessful firm or department may become a permanently failing organization.

In the Shoreham case, the executives of LILCO did not succumb to bankruptcy or let their firm become such a permanently failing organization. Nor did they make a simple exit from the nuclear plant via executive turnover or deinstitutionalization of the project, perhaps because the losses would have been too enormous to allow the company to survive. Instead, LILCO extricated itself from Shoreham with help from third parties. LILCO did this, not by surrendering to the influence of external constituencies, but by carefully managing them.

Although LILCO frequently marshaled support for Shoreham from external parties like the nuclear power industry and the U.S. Department of Energy, it managed to avoid becoming so indebted to or controlled by these external allies that it could not walk away from the embattled facility. At the same time, LILCO overcame the opponents of Shoreham by remaining steadfast in its commitment to the losing project. Almost as if playing a high-stakes game of chicken, LILCO convinced external opponents that it would pursue Shoreham to the bitter end, even if it meant the possible ultimate ruin of the utility. In a sense, LILCO conveyed to its protagonists that it had no

viable options or means to move away from the Shoreham project, somewhat like the car driver displaying a severed steering wheel to his approaching adversary described by Schelling (1960). In the end, by keeping its commitment to Shoreham, LILCO convinced such external parties as the state of New York, the Public Service Commission, and Suffolk County to alter the economics of the situation. The state's offer to buy Shoreham in exchange for tax write-offs and future rate increases drastically changed the project economics for LILCO, making it finally possible to close the nuclear plant.

Was Shoreham's management of external constituencies to the point of negotiated withdrawal an exceptional case, one perhaps possible only for a public utility? We think not. Any enterprise with products or processes that affect the public welfare has the potential to receive a public bailout, as the cases of Lockheed Aircraft Corporation, with its large defense business, Chrysler Corporation, with its large employment base, and the recent savings and loan debacle demonstrate. Thus, if an organization is large enough and the consequences of persistence in a losing course of action are dire enough, there is room for the organization to negotiate with external constituencies. If public assistance is unavailable, additional loans or credits may be possible if other parties, such as banks, are tied deeply enough to the survival of the failing enterprise. Finally, if the organization supplies products that are essential for the operation of other firms, and especially if it is a sole or near-sole supplier, downstream customers may come to its aid.

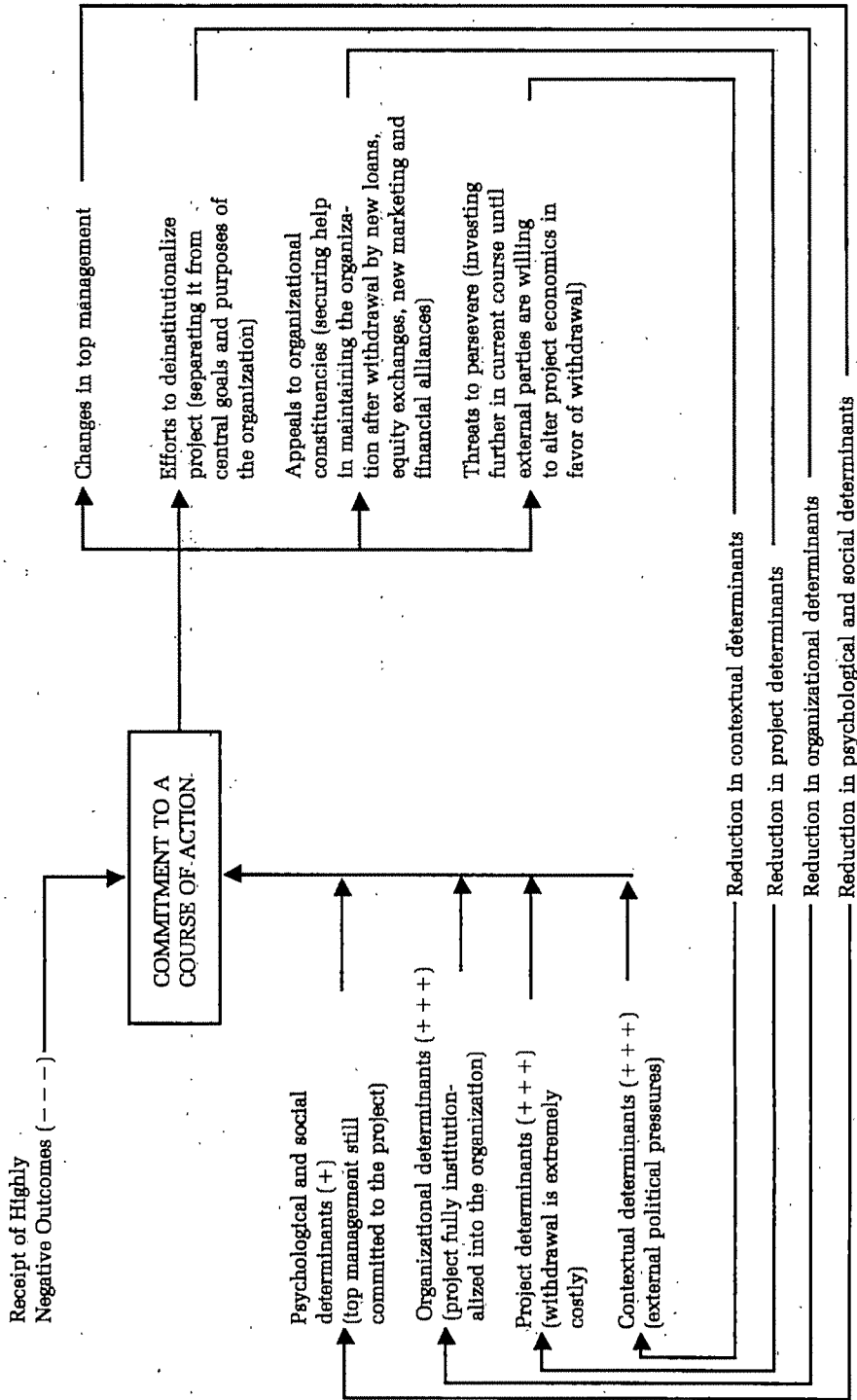
Figure 3 illustrates the lessons of Shoreham for organizational exit. The figure begins with the depiction of commitment to a late-stage escalation episode and likely levels of psychological, social, project, organizational, and contextual sources of commitment. The figure outlines what we now believe are four common strategies of extrication from such late-stage escalation episodes and shows the theoretical mechanisms by which these forms of exit may operate.

The most obvious means of exit, according to previous escalation studies, is a change in top management. For example, when William Catacosinos replaced Charles Pierce as CEO of LILCO, concerned parties both inside and outside the company perceived that deescalation of commitment was more likely than it had been before. As one report said, "The managers [at LILCO] who have devoted several years of their careers to preparing the plant for operation [sat] stone-faced as Mr. Catacosinos [said], 'I want this plant to open, but I'm not married to it. I don't have the emotional attachment to it that you guys do' " (Wall Street Journal: 1984b). Thus,

Proposition 9: Changes in top management can reduce psychological and social sources of commitment, thus increasing the propensity for withdrawal from a losing course of action.

As we originally noted (Staw & Ross, 1987), exit may also be facilitated when an organization deinstitutionalizes a project, removing it from the core of the firm either by moving it physically away from the central location of

FIGURE 3
Organizational Exit from a Late-Stage Escalation Episode



the company or by emphasizing its peripheral nature. For example, corporate spin-offs of troubled divisions are now common, as are assignments by financial institutions of questionable assets, usually troubled loans, to associated but independently owned "bad banks." Alternatively, by labeling a project as an experimental endeavor, and perhaps as one in which failure is not unexpected, an organization can foster deescalation of commitment. As Campbell (1969) noted, an important principle of managing bureaucracies may be promoting commitment to general problems, while at the same time ensuring that commitment to specific programs is kept in check. Thus,

Proposition 10: Efforts to deinstitutionalize a project, or to separate it from the central goals and purposes of an enterprise, can reduce organizational determinants of commitment, thereby increasing the propensity for withdrawal.

Finally, as the Shoreham case demonstrates, it may also be possible for an organization to exit from a losing course of action by appealing to various constituencies to change the economics of a project. This can be done by getting financial help from employees, via the suspension of work rules or pay increases, for instance; from stockholders, by suspending dividends or exchanging debt for equity; from supplier firms, via generous payment terms for merchandise; or from financial backers, by debt restructuring. Somewhat paradoxically, as shown in the Shoreham case, external parties may also come to the rescue of a declining organization via threats to persevere in the losing course of action. Thus,

Proposition 11: Appeals to favoring organizational constituencies (for new loans and support) can change a project's economics so that withdrawal is not so costly and thus more likely to be chosen as an alternative.

Proposition 12: Threats to persevere in a losing course of action can influence opposing constituencies to change a project's economics, thus making it less costly (and more likely) for withdrawal to occur.

These propositions on organizational exit can be viewed as a logical extension of the temporal model of escalation, helping to specify what happens at the latter stages of a costly cycle of escalation. Obviously, many of these propositions are speculative. Although the Shoreham case provides some long-needed data on how organizations cope with and finally extricate themselves from costly courses of action, the propositions based on this case need additional verification.

As the Shoreham case illustrates, much more research is needed to explain the dynamics of both escalation and exit. We believe it is essential that this research be both multilevel and multimethod. A variety of approaches, drawing on experimental, archival, questionnaire, and case study data, can contribute to this pursuit. We should remember, however, that if

the goal is to understand organizational escalation, greater attempts must be made to lodge the research within organizational contexts. Only by conducting contextually based research can observers fully understand how organizations are drawn into losing courses of action and how they may be able to extricate themselves from these predicaments.

REFERENCES

- Arkes, H. R., & Blumer, C. 1985. The psychology of sunk costs. *Organizational Behavior and Human Decision Processes*, 35: 124-140.
- Bateman, T. 1983. *Resource allocation after success and failure: The roles of attributions of powerful others and probabilities of future success*. Working paper, Department of Management, Texas A&M University, College Station.
- Brockner, J., Nathanson, S., Friend, A., Harbeck, J., Samuelson, C., Houser, R., Bazerman, M. H., & Rubin, J. Z. 1984. The role of modeling processes in the "knee deep in the big muddy" phenomenon. *Organizational Behavior and Human Performance*, 33: 77-99.
- Brockner, J., & Rubin, J. Z. 1985. *Entrapment in escalating conflicts*. New York: Springer-Verlag.
- Brockner, J., Rubin, J. Z., & Lang, E. 1981. Face-saving and entrapment. *Journal of Experimental Social Psychology*, 17: 68-79.
- Bryman A. 1988. *Quantity and quality in social research*. London: Unwin Hyman.
- Campbell, D. T. 1969. Reforms as experiments. *American Psychologist*, 24: 409-429.
- Campbell, D. T. 1975. "Degrees of freedom" and the case study. *Comparative Political Science*, 8: 178-193.
- Conlon, E. J., & Parks, J. M. 1987. Information requests in the context of escalation. *Journal of Applied Psychology*, 72: 344-350.
- Cook, J. 1985. Nuclear follies. *Forbes*, February 11: 1-100.
- Elsbach, K. D., & Sutton, R. I. 1992. Acquiring organizational legitimacy through illegitimate actions: A marriage of institutional and impression management theories. *Academy of Management Journal*, 35: 699-738.
- Ford, D. 1986. *Meltdown*. New York: Simon & Schuster.
- Fox, F. V., & Staw, B. M. 1979. The trapped administrator: Effects of a job insecurity and policy resistance upon commitment to a course of action. *Administrative Science Quarterly*, 24: 449-471.
- Garland, H. 1990. Throwing good money after bad: The effect of sunk costs on the decision to escalate commitment to an ongoing project. *Journal of Applied Psychology*, 75: 728-731.
- Garland, H., Sandefur, C. A., & Rogers, A. C. 1990. De-escalation of commitment in oil exploration: When sunk costs and negative feedback coincide. *Journal of Applied Psychology*, 75: 721-727.
- Glaser, B., & Strauss, A. L. 1967. *The discovery of grounded theory*. Chicago: Aldine.
- Goltz, S. M. 1992. A sequential analysis of continued investments of organizational resources in nonperforming courses of action. *Journal of Applied Behavior Analysis*, 25: 561-574.
- Goodman, P. S., Bazerman, M., & Conlon, E. 1980. Institutionalization of planned organizational change. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior*, vol. 2: 215-246. Greenwich, CT: JAI Press.
- Grossman, K. 1986. *Power crazy*. New York: Grove Press.

- Komonoff, C. 1982. *Power plant cost escalation: Nuclear and coal capital costs, regulation and economics*. New York: Van Nostrand Reinhold.
- McCain, B. E. 1986. Continuing investment under conditions of failure: A laboratory study of the limits to escalation. *Journal of Applied Psychology*, 71: 280-284.
- March, J. G. 1978. Bounded rationality, ambiguity, and the engineering of choice. *Bell Journal of Economics*, 9: 587-608.
- Meyer, M. W., & Zucker, L. G. 1989. *Permanently failing organizations*. Newbury Park, CA: Sage.
- Miller, D. T., & Ross, M. 1975. Self-serving biases in the attribution of causality: Fact or fiction? *Psychological Bulletin*, 82: 213-225.
- Nation. 1986. Shoreham evacuation plan. 242: 202-203.
- National Review. 1988. Shoreham and the environmental guerrillas. June 24: 14-15.
- Nature. 1987. U.S. nuclear elephants stay white. August 13: 561-562.
- New York Times. 1966. Utility planning nuclear plant in Suffolk County. April 14: 22.
- New York Times. 1976a. The nuclear power debate. March 28: XXI-35.
- New York Times. 1976b. Californians vote 2 to 1 against nuclear curbs. June 9: 26.
- New York Times. 1977a. LILCO polls show A-plant backing, but with a decrease in support. September 1: III-8.
- New York Times. 1977b. LILCO study planned. September 21: II-3.
- New York Times. 1978. Shoreham and the new gadflies. August 8: XXI-16.
- New York Times. 1979a. P.S.C. unit asks an investigation of a LILCO plant. March 7: XXI-1.
- New York Times. 1979b. Shoreham action is one of largest held worldwide. June 4: 1.
- New York Times. 1979c. LILCO is denied most of requested increase. April 18: XXI-1.
- New York Times. 1979d. Questions loom on Shoreham. April 28: 27.
- New York Times. 1980. Shoreham clouds LILCO financing. June 8: XXI-1.
- New York Times. 1981a. Financial analysts wary about LILCO's future. May 10: XXI-1.
- New York Times. 1981b. Suffolk debates LILCO evaluation plan. May 24: XXI-15.
- New York Times. 1983a. L.I. atom plant nearly ready but the debate goes on and on. January 16: 1.
- New York Times. 1983b. Suffolk requests a halt in Shoreham hearings. February 24: II-2.
- New York Times. 1983c. Safety of Shoreham plant debated. March 11: II-1.
- New York Times. 1983d. Shoreham: Big problems and no easy solutions. September 24: I-26.
- New York Times. 1984a. Chief executive at LILCO resigns: Shoreham stance was criticized. January 31: I-1.
- New York Times. 1984b. A chronology of the Shoreham plant. February 19: I-1.
- New York Times. 1984c. LILCO estimate rises for Shoreham costs. February 24: II-2.
- New York Times. 1984d. Shoreham plant called complete but is it ready? March 18: XXI-1.
- New York Times. 1985a. Fuel rod loading complete at Shoreham nuclear power plant. January 21: II-4.
- New York Times. 1985b. How U.S., behind scenes, backed Shoreham plant. March 31: XXI-1.
- New York Times. 1985c. Suffolk official, in shift, orders Shoreham drill. June 1: I-2.
- New York Times. 1985d. LILCO starts up Shoreham at lower power. July 8: II-3.

- New York Times.** 1986a. Disaster in Soviet affects Shoreham. May 1: I-14.
- New York Times.** 1986b. Suffolk votes Shoreham suit, charging deception by LILCO. June 1: I-37.
- New York Times.** 1987. Shoreham's fate. February 21: I-30.
- New York Times.** 1988a. New York to shut \$5 billion A-plant in deal with LILCO. May 27: II-2.
- New York Times.** 1988b. Order by Reagan seeks the opening of A-power plants. November 19: I-1.
- New York Times.** 1989a. Cuomo and LILCO sign a new accord to shut Shoreham. March 1: II-4.
- New York Times.** 1989b. License means more conflict on Shoreham. April 22: I-29.
- New York Times.** 1989c. Federal plan to save Shoreham unveiled as critics charge stalling. July 29: I-28.
- New York Times.** 1990. NRC modifies stand on closing Shoreham. November 4: XII-4.
- New York Times.** 1991a. U.S. Appeals Court clears way to dismantle Shoreham A-plant. July 20: I-1.
- New York Times.** 1991b. Supreme Court refuses to block Shoreham plan. August 3: I-23.
- Nisbett, R., & Ross, L. 1980. *Human inferences: Strategies and shortcomings of social judgment*. Englewood Cliffs, NJ: Prentice-Hall.
- Northcraft, G. B., & Neale, M. A. 1986. Opportunity costs and the framing of resource allocation decisions. *Organizational Behavior and Human Decision Processes*, 37: 348-356.
- Northcraft, G. B., & Wolf, G. 1984. Dollars, sense, and sunk costs: A life cycle model of resource allocation decisions. *Academy of Management Review*, 9: 225-234.
- Pfeffer, J. 1981. *Power in organizations*, Marshfield, MA: Pitman.
- Platt, J. 1973. Social traps. *American Psychologist*, 28: 641-651.
- Pringle, P., & Spiegelman, M. 1981. *The nuclear barons*. New York: Holt, Rinehart & Winston.
- Ross, J., & Staw, B. M. 1986. Expo 86: An escalation prototype. *Administrative Science Quarterly*, 31: 274-297.
- Ross, J., & Staw, B. M. 1991. Managing escalation processes in organizations. *Journal of Managerial Issues*, 3: 15-30.
- Salancik, G. R. 1977. Commitment and the control of organizational behavior and belief. In B. M. Staw & G. R. Salancik (Eds.), *New directions in organizational behavior*: 1-54. Malabar, FL: Kreiger.
- Schelling, T. 1960. *The strategy of conflict*. Cambridge, MA: Harvard University Press.
- Schwartz, H., & Jacobs, J. 1979. *Qualitative sociology: A method to the madness*. New York: Free Press.
- Simonson, I., & Staw, B. M. 1992. Deescalation strategies: A comparison of techniques for reducing commitment to losing courses of action. *Journal of Applied Psychology*, 77: 419-426.
- Staw, B. M. 1976. Knee-deep in the big muddy: A study of escalating commitment to a chosen course of action. *Organizational Behavior and Human Performance*, 16: 27-44.
- Staw, B. M., & Fox, F. 1977. Escalation: Some determinants to a previously chosen course of action. *Human Relations*, 30: 431-450.
- Staw, B. M., McKechnie, P. I., & Puffer, S. M. 1983. The justification of organizational performance. *Administrative Science Quarterly*, 28: 582-600.

- Staw, B. M., & Ross, J. 1978. Commitment to a policy decision: A multitheoretical perspective. *Administrative Science Quarterly*, 23: 40-64.
- Staw, B. M., & Ross, J. 1980. Commitment in an experimenting society: An experiment on the attribution of leadership from administrative scenarios. *Journal of Applied Psychology*, 65: 249-260.
- Staw, B. M., & Ross, J. 1987. Understanding escalation situations: Antecedents, prototypes, and solutions. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior*, vol. 9: 39-78, Greenwich, CT: JAI Press.
- Teger, A. 1980. *Too much invested to quit*. New York: Pergamon.
- Wall Street Journal*. 1977. In the fight over nuclear energy's role, friends and foes are deeply committed. July 21: 32.
- Wall Street Journal*. 1979. Long Island Lighting sees delay, cost rise at a nuclear facility. May 31: 2.
- Wall Street Journal*. 1982. Fusion of the Lord, nuclear plant causes Long Island fission. March 23: 21.
- Wall Street Journal*. 1983. LILCO is criticized on Shoreham plant by New York panel. December 15: 20.
- Wall Street Journal*. 1984a. LILCO's Pierce quits as chairman, chief; Catacosinos elected. January 31: 44.
- Wall Street Journal*. 1984b. New LILCO chief brings blast of aggressiveness to floundering utility. April 27: 1.
- Wall Street Journal*. 1985a. Panel says LILCO should absorb part of Shoreham plant. March 14: 14.
- Wall Street Journal*. 1985b. LILCO can't charge users for a third of Shoreham. June 27: 6.
- Wall Street Journal*. 1986. New York law is signed to allow LILCO takeover. July 28: 7.
- Wall Street Journal*. 1987. LILCO wins ruling on act. August 5: 26.
- Wall Street Journal*. 1988. LILCO chairman tries to outflank Cuomo. May 20: 32.
- Wall Street Journal*. 1989a. NRC is closer to licensing Shoreham plant. March 6: A7.
- Wall Street Journal*. 1989b. Bush administration joins suit in bid to save LILCO's Shoreham. August 14: A5.
- Yin, R. K. 1989. *Case study research: Design and methods* (2nd ed.). Newbury Park, CA: Sage Publications.

Jerry Ross is a professor in the Department of Management and Quantitative Methods, College of Business, Illinois State University. He received his Ph.D. degree from Northwestern University. His research interests include organizational stratification and dispositional sources of job attitudes and behavior.

Barry M. Staw is the Mitchell Professor of Leadership and Communication at the Haas School of Business, University of California, Berkeley. He received his Ph.D. degree from Northwestern University and has taught previously at Northwestern, the University of Illinois, and the University of Iowa. His research interests include job attitudes, organizational innovation, and escalation processes in organizations.

RELATIVE STANDING: A FRAMEWORK FOR UNDERSTANDING DEPARTURES OF ACQUIRED EXECUTIVES

DONALD C. HAMBRICK
Columbia University

ALBERT A. CANNELLA, JR.
Texas A&M University

Prior attempts to explain the departure rates of the executives of acquired firms, primarily through strategic and economic logics, have yielded limited results. This study drew on the concept of relative standing, or local social status, to explain why some acquired executives depart. Using a dynamic modeling methodology to study 430 executives in 97 acquired firms, we present evidence to support this new perspective on executive departure. Implications and directions for future research on postacquisition outcomes are discussed.

"We bought you. You belong to us. Fill out our forms. Come to meetings in our offices. Put our name on your stationery. If you want to go to the bathroom, ask us." They didn't quite put it that way, but that's the way I heard it. (Senior executive of a large, recently acquired firm, soon after his resignation "to pursue other interests")

Acquisitions, even the friendliest, disrupt organizational social standings, often amid an aura of conquest (Hirsch, 1986). Such disruptions have been documented, but their implications for the continuity of the executives of acquired firms are not well understood. The central tenet of this article is that the departure of acquired executives is best understood as an outgrowth of social processes, particularly what Frank (1985) termed relative standing. Some acquisitions result in extremely low relative standing for acquired executives—they feel inferior, the acquirers see them as inferior and themselves as superior, autonomy is removed, status is removed, and a climate of acrimony prevails. The greater these conditions, the higher the rate of departure of acquired executives. Conversely, when the relative standing of acquired executives is higher, departure rates will not be as high.

In taking this view, we hope to complement the prevailing logics of economic and strategic rationality for explaining the consequences of acquisitions (e.g., Jensen, 1988; Manne, 1965; Salter & Weinhold, 1979, 1988;

Support from the Columbia University business school's Management Institute is gratefully acknowledged.

Trautwein, 1990). The world of organizations is rife with social phenomena: social dominance, status, perceptions of superiority and inferiority, supervision and supplication, winning and losing. Such issues significantly affect organizational outcomes, and their role in the highly charged, stressful aftermaths of acquisitions is expected to be particularly substantial.

BACKGROUND AND THEORY DEVELOPMENT

Significance of the Topic

Organization and strategy theorists have long been interested in executive turnover (e.g., Grusky, 1969; Wagner, Pfeffer, & O'Reilly, 1984). Although top executives do not control all decision making, they are at the apex of an organization, and what happens to them—their retention or departure—both reveals important political and institutional arrangements and predicts major organizational outcomes (Hambrick, 1989; Virany, Tushman, & Romanelli, 1992).

The departure of acquired executives is a special but important case of executive turnover. For one's firm to be acquired is to experience disruption and usually some degree of loss; accordingly, the departure rates of acquired executives are inordinately high (Walsh, 1988). Of course, one motivation for an acquirer's making an acquisition is to obtain assets that are underutilized and then replace the managers with those who can extract more value. In such a case, the departure of acquired executives is seen as expected and necessary (Fama, 1980; Jensen & Meckling, 1976). However, some researchers have argued that acquired executives are essential resources; they are not easily replaceable, and their departures cause social and decision-making problems that lessen the value of an acquired entity (Pitts, 1976; Scherer, 1986; Trautwein, 1990). In short, from diverse vantages, the departure of acquired executives is of practical and theoretical significance. An improved understanding of the determinants of executive departure is important to an eventual comprehensive theory of the management of acquisitions.

Executives in target firms may alter their behavior even prior to being acquired; such behavior might include seeking other employment on the basis of little more than rumors about an acquirer's intentions (Hitt, Hoskisson, & Ireland, 1990). And after being acquired, many executives are dissatisfied, often exploring options elsewhere (Buono, Bowditch, & Lewis, 1985; Costello, Cubis, & Shaffer, 1963). Hayes and Hoag (1974) found that 58 percent of the acquired executives they studied left the acquired firms within five years. This result is close to Walsh's (1988, 1989) findings that 61 percent of acquired executives departed within the first five years, compared to 33 percent in a control sample of nonacquired firms.

Although the tendency of acquired executives to depart has been well documented, the specific factors that influence departure rates are not well understood. Walsh has done essentially the only systematic research into such determinants (Walsh, 1988, 1989; Walsh & Ellwood, 1991). The three

cited works are important, but, as Walsh noted, they are not conclusive. We drew from all of Walsh's research in developing our theory and hypotheses, but one finding is particularly suggestive of our overall thinking.

Walsh and Ellwood (1991) pursued the theory that the dismissal of acquired executives is the discipline acquirers impose for the prior inefficiencies of acquired firms. Contrary to hypothesis, the stock market performance of the target companies prior to acquisition was not associated with departure rates after the acquisitions. However, the performance of the acquirers was associated with acquired executive departure: the better an acquirer's preacquisition performance, the lower the acquired executive departure rate in the first year, and the higher the departure rate in the second year.¹ Thus, it appears that a strong theory of executive departure must encompass characteristics of not only acquired firms, but also of acquiring firms and, perhaps more important, relational attributes of the two.

Relative Standing: A New Explanation for Acquired Executive Departure

A promising explanation for acquired executive departure may exist in the realm of research on social status. Acquisitions are often surrounded by an aura of conquest (Haspeslagh & Jemison, 1991; Hirsch, 1986). If the acquirers feel dominant or superior, and they reveal those feelings in their interactions with, and policies toward, the acquired executives (including, but not limited to, outright dismissal), the departure rate of the acquired executives will be affected. Similarly, if the acquired executives feel inferior, stripped of status, or locked in a struggle with the acquirers, they will tend to depart. Obviously, the attitudes and actions of the acquirers and the acquired influence each other; the acquirers' acts of dominance evoke feelings of subjugation, probably visibly expressed, which in turn evoke a greater sense of superiority in the acquirers, and so on.

Thus, quite beyond the well-known empirical difficulties in distinguishing between voluntary and involuntary executive departures, under our view the two types of departure merge conceptually as well. Acquired executives who feel inferior may quit before being fired; acquiring executives who see themselves as superior may create intolerable conditions for acquired executives, who then quit without being literally fired; or, under the strain of being made to feel inferior, acquired executives may behave belligerently or erratically or in other ways that get them fired, even though

¹ In interpreting Walsh's work, however, an important analytic issue needs to be considered. In all three studies, Walsh used as his dependent measure the percentage of the originally acquired executives who departed in a given year. However, if a significant portion of a team leaves in the first year (which, on average, does occur), those individuals should be excluded from the denominator in calculations of departure rates for later years; they are not available to depart. This problem is illustrated by a statistical artifact in Walsh's 1988 results, namely, a significant negative correlation between year one departure rates and those of years two and three. A more satisfactory approach would be to examine only the rates of departure of individuals who are present at the beginning of a given period.

dismissals were not intended. Assigning clear-cut roles in the dissolution of any relationship—a marriage, a community, an executive's employment—may sometimes be straightforward. More often, however, it is essentially impossible, for mutuality is a defining element of any relationship. Thus, in the case of interest here, voluntary and involuntary departures are propelled by the same forces: an interconnected web of manifested beliefs about superiority and inferiority.

We adopted relative standing as the overarching construct that encompasses the beliefs and behaviors described above. Frank (1985) introduced relative standing to describe an individual's status relative to that of others in a proximate social setting, such as a neighborhood, a company, or a team. In an intriguing combination of economic and social theory, Frank used relative standing to explain the tendency for low-status individuals in an organization to capture economic rewards out of proportion to their marginal products, a phenomenon he viewed as compensation for their holding low-status roles and hence giving others the opportunity to have higher status. Similarly, high-status individuals give up some of the economic returns potentially due them for the satisfaction of having others be below them in status. In short, relative standing was for Frank a basis for explaining the calculus a human being performs in making trade-offs between being a big frog in a small pond or a small frog in a big pond.

Even though relative standing can be considered a unified construct, it has numerous facets. It derives from people's real or attributed abilities and performance and other status characteristics, all viewed in relation to those of others in a given social unit (Cohen & Zhou, 1991). Relative standing is manifested in such things as access to centers of power, titles, others' acts of respect, inclusion, and warmth (or conversely, in disrespect, exclusion, and coolness). Low or diminished relative standing can have various effects. As Frank argued, if individuals are somehow compensated for their low standing, they may stay in an organization as productive members; if they are not so compensated, disaffection or even exit will occur (Hirschman, 1970).

Other theorists have developed relational models of human behavior that inform the view taken here. Perhaps most notable is the social comparison theory put forth by Festinger (1954), who argued that the self is defined in comparison to others. In essence, individuals seek to evaluate their own abilities and opinions by comparing themselves to others. Adams (1965) introduced equity theory, arguing that individuals will be satisfied in a social setting to the extent that they perceive the ratio between their efforts and rewards as similar to that of a referent group. Both social comparison and equity theory have spawned substantial research, supporting the general conclusion that individuals evaluate their situations relative to what others have, to how others treat them, or to what they themselves once experienced. Acquisitions provide a natural setting in which to develop and test relational models, since acquired executives are placed in a new social setting in which comparisons to their acquirers as well as comparisons to their own prior situation are inevitable and highly salient.

Our research in no way attempted an exhaustive or all-inclusive explanation of the departure of acquired executives. A number of potentially important issues lay outside our theoretical focus, including the labor market conditions for acquired executives, their wealth (including their ownership positions and "golden parachute" provisions),² acquiring firms' structures, acquisition motives, and experience, and numerous other seemingly reasonable factors. Our aim instead was to set forth and examine a single, promising line of logic—the concept of relative standing—as a means for comprehending a portion of the phenomenon of acquired executive departure.

Development of Hypotheses

Many acquired executives experience status degradation (Gephart, 1978), but such diminishment is more likely in some situations than others. In this section, we develop hypotheses about the conditions related to the most extreme declines in the relative standing of acquired executives, making their departure most likely. Throughout, our unit of analysis is the departure of the individual executive; however, we examine a combination of organization-level and individual-level indicators of relative standing.

At this early stage in the development of theory about relative standing as a propelling factor in executive behavior, we examined a set of complementary indicators of circumstances attending and following acquisitions. These are as follows: the preacquisition performance of an acquired firm relative to that of the acquiring firm; the social climate of the acquisition, whether friendly or hostile; the relative size of the two firms; the extent to which the acquired firm's autonomy is removed; and the extent to which acquired executives receive status in the merged entity.

These indicators have the advantage of allowing reliable measurement for a large-sample study, shedding light on several aspects of acquisition. They have the disadvantage of not directly gauging the interactions and attitudes of the executives involved. Our independent variables are only suggestive; they tap conditions that create executives' perceptions of relative standing, but they do not gauge the perceptions themselves.³ In our final

² A golden parachute is a contingent compensation contract designed to pay an executive an amount in cash (usually three years' salary) in the event of a takeover.

³ Hence, our project shares an important limitation with a number of other empirical inquiries into top management processes. Namely, we examined associations between observable phenomena but did not measure the operative mechanism posited as causing the associations. Examples of other research with this limitation are the many studies of relationships between executive demographic and organizational characteristics, in which the imputed causal mechanisms are psychological phenomena (e.g., Bantel & Jackson, 1989; Finkelstein & Hambrick, 1990; Kimberly & Evanisko, 1981), and the many studies that have examined associations between corporate ownership profiles and executive choices, in which the unobserved intervening mechanisms are owner-board power and vigilance (e.g., Amihud & Lev, 1981; McEachern, 1975). The results of such studies can be only theoretically suggestive, not definitive, since

(continued)

section, on future research, we address the methods and measures that might extend our findings.

Proposal on the timing of effects. We not only set forth hypotheses about the effects of the above-noted determinants on executive departure, but also indicate our expectations on the timing of those effects. Because there is little prior research to inform such expectations, we do not state them as formal hypotheses. Still, we are explicit about these expectations, in the hope that we can help improve understanding of the temporal dynamics of postacquisition phenomena. As will be seen, we employed dynamic analysis to examine associations over a four-year postacquisition period.

At this point, however, we can make the overarching assertion that, over time, relative standing will have diminishing effects on the departure of acquired executives. Walsh's research (1988) indicates that acquired executives only depart at extraordinary rates for two years following acquisitions. General observation and anecdotal accounts suggest the strains of most acquisitions greatly diminish after two or three years. Specifically invoking our theory, we expected that phenomena connected to relative standing will be most pronounced immediately following an acquisition, will continue to be manifested through a lingering but finite period, and will eventually cease to be evident at all. That is, the longer an acquired executive serves in a combined firm, the less matters of relative standing—at least those accompanying the acquisition—will be associated with departure. Thus, we propose that in the aggregate, indicators of relative standing will have a very pronounced association with acquired executive departure in the first year following an acquisition; the effects will continue to be significant, but not as strong or pervasive, in the second and third years; and no associations will be evident in the fourth year.

Preacquisition performance. The performance of a company, particularly extreme performance, is commonly attributed to its top managers (Meindl, Ehrlich, & Dukerich, 1985). In the eyes of many, good performance implies executive competence. In fact, some acquisitions are undertaken precisely because the incompetence of the incumbent management is seen as the chief impediment to improvements (Fama & Jensen, 1983; Jensen & Meckling, 1976).

Even if an executive of a poorly performing firm is not fired outright after its acquisition, he or she may feel inferior and depart voluntarily. The executive who stays will experience low status and various forms of disdain, which will lead eventually to voluntary or involuntary departure. Even more than acquired executives in general, the executive from the poorly performing firm will be treated by the acquirers as a "pigeon"—helpless and ineffectual (Hirsch, 1986). This line of argument leads to our first hypothesis:

the intervening processes have not been examined. Yet such inquiries are valuable, helping to establish broad patterns and direct later research that does obtain data on the intervening processes.

Hypothesis 1a: The lower the preacquisition performance of an acquired firm, the greater an acquired executive's propensity to depart.

However, in keeping with our logic about the role of relative standing, the performance of an acquired firm may not be nearly as predictive of executive departure as its performance relative to that of the acquiring firm. Walsh and Ellwood's (1991) results imply as much, showing no effect for acquired companies' prior stock performance on executive departure but significant effects for acquiring firms' prior stock market performance.

The combination of the high performance of an acquiring firm and the low performance of an acquired firm would particularly lead to perceptions of a wide gap in the relative standing of the two managerial groups, in turn leading to extremely high departure rates of the acquired executives. In such a situation, the acquiring executives may have great confidence in their managerial abilities, a hubris that leads them to believe they can fully manage the acquired firm themselves or, at a minimum, impose their decisions on its executives (Porter, 1987; Roll, 1986). At the same time, the acquired executives, who are anticipating the dominating behaviors of their "conquerors" and recognizing that their own career prospects and discretion are likely to be severely confined (Hambrick & Finkelstein, 1987; Hirsch, 1986), may feel inferior. The departure of acquired executives will be very pronounced under such conditions.

When the performance of the two firms is similar, perceptions of superiority and inferiority and behaviors linked to those perceptions will not be great; and when the acquired company's performance exceeds the acquiring company's, the acquired executives will have a more favorable relative standing, giving them greater self-esteem, more discretion, and better prospects. Thus,

Hypothesis 1b: The lower the preacquisition performance of an acquired firm relative to that of an acquiring firm, the greater an acquired executive's propensity to depart. This will be a stronger association than that observed on the basis of the acquired firm's performance alone.

The effects of preacquisition performance on acquired executive departure were expected to be particularly great immediately following an acquisition. Prompt dismissals can be expected as part of the settling-up for prior poor performance (Fama, 1980; Jensen & Meckling, 1976), particularly performance that has been inferior to that of the acquiring firm. Moreover, acquired executives will judge their own prospects on the basis of their company's prior performance and make relatively immediate decisions about whether to stay or not.

However, not all effects of prior performance will be observed at the very outset. For executives who do not leave immediately, perceptions of superiority and inferiority may linger. Executives who have been in poorly performing firms may meet with discretion restrictions and disdainful treat-

ment; those who have been in better performing firms will be treated more respectfully by acquirers. In fact, any delayed effects of prior performance on departure will serve to support our contention that relative standing and accompanying perceptions of superiority and inferiority, and not just the disciplining of prior poor performance, actively affect postacquisition departures. In sum, we expected the effects of poor performance to be very pronounced in the first year following an acquisition, less pronounced but still significant in years two and three, and nil in year four.

An important question is whether perceptions of executive superiority and inferiority, as gauged by company performance, tend to incorporate industry conditions. If the preacquisition performance of an acquired firm was low, but not as low as average performance in its industry, would its executives be seen as relatively able? Rationally, it makes sense to incorporate industry conditions in attributions of managerial competence; yet, there is evidence that an organization's performance, particularly at the extremes, is attributed nearly totally—even by knowledgeable parties—to its top managers (Chen & Meindl, 1991; Meindl et al., 1985). Thus, without setting forth a hypothesis, we additionally examined whether Hypotheses 1a and 1b held with greater strength when acquiring and acquired industry conditions were included in measures of performance.

Relative size. Frank's (1985) theory of relative standing led to some predictions about how the size of an acquired firm affects its executives' propensity to depart. The most straightforward expectation, to which we adhered, is that the smaller an acquired firm relative to its acquirer, the more likely an executive will be to depart. A small acquisition presents Frank's classic case of a big frog in a small pond suddenly becoming a very small frog in a big pond. Accustomed to status, autonomy, and discretion—albeit in a small enterprise—an executive of a small company suddenly lacks much significance when the acquiring company is very large. At the other extreme, when the acquired company is relatively large, an executive may retain some feeling of centrality and importance, not experiencing as much diminishment. Therefore,

Hypothesis 2: The smaller an acquired firm relative to an acquiring firm, the greater an acquired executive's propensity to depart.

The effects of relative size were expected to be particularly great immediately following acquisitions—that is, within the first year. Acquired executives will promptly form perceptions about how significant they will be in the combined enterprise and act immediately on those perceptions, not desiring to be in a situation of greatly reduced stature.

Social climate. Jemison and Sitkin (1986) argued that when the decision makers of two firms mutually deliberate their joining, the likely uncertainty and acrimony following the union will be lessened. A central element of such deliberations is the negotiation process, which greatly shapes the social

climate surrounding the acquisition and potentially affects relations between acquired and acquiring executives for months or, as Walsh (1989) suggested, years later.

The executives and boards of both firms discuss and approve mutually negotiated mergers. Acquired executives can outline a framework for retaining status and discretion following such a merger, thus reducing their sense of helplessness and mitigating the perception that they are the losers of a contest (Hirsch, 1986). The negotiation process allows an open and extended discourse, reducing potential social conflict. Accordingly, departures of acquired executives should be minimal.

Uncontested tender offers are unions in which an acquirer bypasses a target firm's management by extending an offer directly to shareholders; in turn, the target management does not resist the offer, either because it has little grounds for resistance or little to gain from it. Bypassing target management produces more potential for conflict than occurs with a friendly union. Moreover, tender offers often include share price premiums higher than those made in mergers (Chatterjee, 1986), thus increasing the pressure on the acquiring firms to extract high performance from the acquisitions. This pressure in turn leads to intrusions and strains that heighten the acrimony between the two groups of executives. However, the absence of resistance makes this situation less acrimonious than the one to which we now turn.

Contested tender offers represent an extreme in social conflict. In these instances, target and acquiring firm executives battle each other in a very public forum, each claiming the other party's inadequacy. The atmosphere surrounding such an acquisition is likely to be characterized by bitterness and acrimony, making smooth social integration after the deal unlikely. Both groups of executives tend to be suspicious of the other's motives and intentions. A contested tender offer leads to clear perceptions that the struggle has produced winners and losers, and acquired firm executives are consistently placed in the latter category (Hirsch, 1986; Hirsch & Andrews, 1983).

An acquirer's leaving acquired executives in positions of authority under these circumstances could greatly increase the threat of stonewalling and sabotage (Buono et al., 1985). Machiavelli (1966) argued that the best defense against retaliation from a vanquished foe is to eliminate that foe. If acquired executives are not released outright, their roles in the merged firms would be inevitably uncomfortable, and their subsequent departure can be expected. For these reasons, the likelihood of an acquired executive's departing following a contested tender offer should be substantially higher than it would be following either an uncontested tender offer or a mutually negotiated union.

Hypothesis 3: Contested tender offers are associated with the highest rate of acquired executives' departure; non-contested tender offers are associated with a lower rate of

departure; and mutually negotiated unions are associated with the lowest rate of departure.

We expected the effects of hostile takeovers on acquired executive departure to be extremely pronounced immediately after acquisitions as a result of the bitterness between the two sets of executives. However, for executives who do not depart immediately, the strains of the takeover will linger; such executives may be treated coolly or even with disdain, and two-way suspicions and mistrust will probably prevail. Thus, we expected the effects of a hostile takeover on executive departure to be particularly great in the first year following an acquisition and less pronounced but still significant through years two and three.

On the other hand, we expected the effects of friendly mergers to be relatively uniform over postacquisition periods. Early on, there will be low departure rates because of the relative cordiality of the negotiation process; later on, at least through year three, the low rate will continue as a result of the high quality of preacquisition planning that tends to accompany friendly mergers (Haspeslagh & Jemison, 1991).

Removal of autonomy. In some instances, acquired executives are permitted a high level of postacquisition autonomy, with strategy, systems, and procedures left to their discretion (Datta & Grant, 1990; Salter & Weinhold, 1979). In other cases, the acquired firm is closely integrated into the acquiring firm and required to adopt its policies and procedures. Such requirements of integration increase acquired executives' perception of dominance by acquiring executives (Bleeke & Daniels, 1985; Siehl, Smith, & Omura, 1990). This removal of autonomy may be a severe blow to acquired executives accustomed to doing things their own way (Buono et al., 1985; Levinson, 1970, 1973). Postacquisition integration also means that many issues will have to be negotiated. Since acquired executives are generally in a subordinate position in these negotiations, the sheer amount of interaction negotiations require will thus increase the mutual perceptions of dominance and supplication (Haspeslagh & Jemison, 1991).

Additionally, restricted autonomy increases the relative standing of acquiring executives because acquired executives must always look to the acquirers for approval (Datta & Grant, 1990; Pitts, 1976). When acquiring executives exert control over the operation of an acquired firm, the perceived value of acquired executives' expertise is reduced, thus lowering their relative standing (Frank, 1985). Thus,

Hypothesis 4: The greater the degree to which autonomy is removed from an acquired firm, the greater an acquired executive's propensity to depart.

We expected the effects of removal of autonomy on executive departure to be relatively slow in appearing, possibly manifesting only in the second and third years. It may take some time for an acquiring firm to decide whether and how to integrate the acquired entity, and longer still for those decisions to be manifested in concrete policies and behaviors (Haspeslagh &

Jemison, 1991; Salter & Weinhold, 1979). It may also take time for the acquired executives to interpret the arrangements under which they are required to operate, since those arrangements are unfolding and usually evolving.

Status bestowal. Prior to acquisition, acquired executives comprise a firm's dominant coalition (March & Simon, 1958), and high status is ascribed to them. As visible officers with links to the external environment, their high status extends beyond the boundaries of the firm, even to their social acquaintances. After an acquisition, acquired executives may find that their status has diminished considerably; they have lost their membership in the dominant coalition and are now merely mid-level or upper mid-level functionaries (Gephardt, 1978; Schweiger, Ivancevich, & Power, 1987; Siehl et al., 1990).

However, acquirers may mitigate this negative effect by bestowing status on acquired executives. For example, an acquired executive can be given a board seat or officership in a postacquisition firm, an action that may increase identification with the acquiring firm (Tajfel & Turner, 1979). Such a status-enhanced executive may feel little status decline and thus will be less likely to depart. In fact, because the postacquisition firm is, virtually by definition, larger than the acquired firm, executives in some cases may enjoy more status after an acquisition than before it.

Hypothesis 5a: An acquired executive who is granted top-level status in a postacquisition firm will have a lower propensity to depart than an executive not awarded such status.

Even when an acquirer bestows top-level status, it is unlikely that all acquired executives will be so favored. It might be argued that an acquired executive given no boost in status whose peer is granted high-level status will be relatively likely to depart, out of a sense of inequity or deprivation (Adams, 1965). However, we believe the opposite result will occur.

Awarding top management team membership to even one acquired executive would seem to imply to other acquired officers that, as a group, they are seen as competent and as providing valuable services; that is, they receive status indirectly (Pfeffer, 1981). Also, the presence of an acquired executive in the new dominant coalition may help reduce some sources of postacquisition friction, because other acquired executives may feel that they have a voice and that their concerns will be heard (Withey & Cooper, 1989). Those executives who become members of the postacquisition top management team may be able to minimize potential sources of conflict and advance their acquired colleagues' interests. These lines of reasoning suggest that the rate of departure among executives who are bestowed indirect status will be lower than that among those without any top management team representation.

Hypothesis 5b: When one or more acquired executives are granted top-level status in a postacquisition firm, the rate

of departure of other acquired executives will be lower than if none of the acquired executives had been granted such status.

To summarize our expectations about status bestowal, we predicted that an executive who is personally granted status in an acquiring firm will have the lowest departure propensity; an executive who has an acquired peer granted status will have an intermediate departure propensity; and an executive who is neither directly nor indirectly granted status will be the most likely to leave.

The effects of status bestowal on executive departure were expected to be relatively uniform over the three years after acquisition. At the outset, status bestowal sends a signal to acquired executives about their potential relative standing in a combined firm; they may promptly act on this signal. However, status bestowal affects ongoing perceptions of standing and, as noted above, can provide the basis for substantively improved relations between acquired and acquiring executives.

METHODS

Data

We sampled acquisitions in which both the acquiring and the acquired companies were publicly held to permit access to preacquisition performance measures. Initially, we identified the largest 200 transactions reported in *Mergers and Acquisitions* during the period 1980–84. Removal of observations in which either firm was not publicly traded or in which the transaction did not result in a single new owner reduced the data set to 138 acquisitions. Availability of data on executive departures (discussed below) further limited the data set to 109. Finally, we were able to obtain usable data on removal of autonomy (described below) for 97 of those 109 acquired firms, involving a total of 430 acquired executives.

Measures

Executive departure. The executives of interest were the top executives of acquired firms before their acquisition, defined as officers holding (1) a title above the rank of vice president, or (2) a board directorship, or both. We identified these individuals from annual reports or Securities and Exchange Commission (SEC) 10K forms filed by acquired firms immediately prior to the acquisition events. The mean number of executives per firm was 4.3, and the range was 1 to 12.

Dates of departure for acquired executives were obtained from the post-acquisition firm. We telephoned all 138 acquiring firms in the initial group, requesting "employment verification" for the individuals of interest. For 78 firms, we obtained the final dates of acquired executives' employment over the phone. In 60 instances, however, the individuals spoken to were unable to release the information verbally. For 19 of these, the acquired firm had

been liquidated or divested, or for another reason the information was not available. We contacted the other 41 firms in writing, and 31 returned the data. The overall response rate (68.6%) is comparable with that of Walsh (1988).

Preacquisition performance. Return on common equity (ROE) was used as the preacquisition performance measure. Although return on assets is also a common choice among researchers, we preferred ROE because the data set included both manufacturing and service firms with widely differing asset configurations. ROE is a well-understood measure of performance that is somewhat comparable across firms and across industries (Fowler & Schmidt, 1988; Long & Ravenscraft, 1984). For both acquiring and acquired firms, we assessed ROE as a three-year average, covering the last full preacquisition fiscal year and the two preceding ones. Market-based measures were not used because rumors of acquisition activity and even potential target firms' ripeness for acquisition seriously disrupt their share prices (Bradley, Desai, & Kim, 1983; Magenheimer & Mueller, 1988). Accounting-based performance measures have well-known limitations, but three-year averages are thought to yield generally robust indications of corporate economic performance.

Because of our interest in the standing of acquired executives relative to that of acquiring executives, we also included a measure of relative performance. This was the three-year average ROE of an acquiring firm minus the three-year average ROE of the acquired firm; we termed this variable relative ROE. Additionally, we examined industry-adjusted ROEs for both acquiring and acquired firms. In each case, the focal firm's three-year ROE was subtracted from the average three-year ROE for its primary three-digit Standard Industrial Classification (SIC) industry; ROEs were calculated from COMPUSTAT data.

Relative size. The relative size of an acquired firm was calculated by dividing its sales in the year preceding the acquisition by the sales of the acquiring firm. This measure was highly correlated with the chief alternative measures using assets and employees.

Social climate. We assessed the social climate of each acquisition by placing it into one of three categories: mutually negotiated unions, uncontested tender offers, or contested tender offers. To separate mergers from tender offers, we searched *Wall Street Journal* reports for indications of either type. In each case, news reports explicitly mentioned one or the other. Then, for acquisitions involving tender offers, we searched *Wall Street Journal* reports for statements from management regarding their support or opposition to the offers. Any statement by a target management of opposition to a tender offer led to classifying the acquisition as contested. Announcements of the acquisitions in *Mergers and Acquisitions* provided a check on the validity of the *Wall Street Journal* reports. In no case did the evidence from the two sources conflict. This measure, although an admittedly limited way to gauge an attribute as rich and multifaceted as social climate, is widely used in the acquisitions literature and was expected to capture a general spectrum of amicability-hostility.

Removal of autonomy. The autonomy of acquired firms was assessed by expert informants. For each acquisition, we identified six acquiring firm officers who were employees of the acquiring firm when the acquisition occurred and six security analysts who were specialists in the acquiring firm's securities when the acquisition occurred. Executives were identified through current annual reports or 10Ks, and security analysts through Nelson's *Directory of Investment Research*. We sent a total of 1,065 surveys out in 1989 (507 to executives, 558 to analysts), asking respondents to rate (on a seven-point scale) the extent to which an acquired firm was operated autonomously (1) or closely integrated with its acquiring firm (7). Of the 1,065 instruments, 353 (33%) were returned, averaging 3.2 per acquisition. For cases with multiple respondents, the measure exhibited high interrater reliability through an intraclass correlation coefficient (Shrout & Fleiss, 1978) of .72, ($p < .001$). For 12 cases, we received no usable responses, which restricted our data set to 97 acquired firms, with a total of 430 acquired executives.

Other researchers have used more elaborate instruments for measuring postacquisition constructs (e.g., Chatterjee, Lubatkin, Schweiger, & Weber, 1992; Datta & Grant, 1990). Datta and Grant found that all 18 items used in an autonomy scale loaded high on a single factor. Moreover, that factor index had a correlation of .85 with a separate question about the "overall level of autonomy provided to the acquired firm" (Datta & Grant, 1990: 35). The latter question was very close to our own, thus implying considerable validity for our measure, supporting the strong interrater reliability noted above.

Status bestowal. The variable assessing personal status bestowal was coded 1 when an acquired executive became an officer or director in a postacquisition firm and 0 otherwise, as indicated in the first SEC filing of the acquiring firm following the acquisition event. This measure, which reveals only titular status, has the advantage of replicability. The status embodied in actual managerial responsibilities goes unmeasured. The indirect status bestowal measure was a variable coded 1 when at least one member of the acquired top team (but not the executive under consideration) became an officer or director in the postacquisition firm, and 0 otherwise.

Age. The age of an executive in years was included as a control variable. Older executives may be more likely to cease employment for reasons outside our scope of interest, such as mandatory retirement, illness, or death. Age data were drawn from company 10K reports and Dun & Bradstreet's *Reference Book of Corporate Managements*.⁴

Relatedness. Also included as controls were two dummy variables to indicate the relatedness of the acquired and acquiring firms. Because our

⁴ In preliminary analyses, we examined individual characteristics of executives other than age for their associations with departure. Specifically, education, tenure in an acquired firm, and functional track were examined for both their main effects on departure and possible interaction effects. No significant results were observed.

data fell outside the time period for which the Federal Trade Commission provides relatedness information, two judges independently categorized each acquisition into one of two categories.⁵ Each judge was provided with business descriptions of the two firms from Moody's manuals and instructed to classify firms as related or unrelated on the basis of their product and market similarities. Firms that produced similar products or served the same or similar customers were coded as related, and other firms were coded as unrelated. Of the group of 97 acquisitions, the judges disagreed on the classification of 6 observations. These conflicts were discussed and resolved. We further refined the above categorization by examining the four-digit SIC codes provided by the Center for Research in Security Prices for acquisitions judged as related. When the two firms were in the same four-digit industry, we classified them as horizontally related. In our analysis, we used a dummy variable for horizontal relationship and another for unrelatedness. The remaining firms, those that were related nonhorizontally, thus formed the omitted base condition.

Statistical Methods

We used a continuous time-event-history method for examining our hypotheses. This method modeled the unobserved hazard rate⁶ of departure among the acquired executives studied. Such an approach offers several advantages over regression or "logit" analysis for examining the antecedents of executive departure. First, these methods are not biased by right-censoring (the occurrence of events after an observation period; Kalbfleish & Prentice, 1980; Tuma & Hannan, 1984). Second, continuous time methods permitted us to model the number of days between an acquisition date and the date of an executive's departure, thus allowing full use of information on the timing of the departure. Further, our particular event history model permits the simultaneous examination of multiple subperiods (Tuma, 1980; Tuma & Hannan, 1984), in turn allowing (1) explicit consideration of the time-varying effects for causal variables and (2) rigorous comparisons of hierarchically nested models to determine whether one way of subdividing time periods yielded a significant improvement over another.

The statistical package RATE was used to analyze the data (Tuma, 1980). The unit of analysis was the acquired executive, and the event of interest was the executive's departure. This method was based on the assumption that two states were possible for studied executives: retained (still employed) and departed. We modeled the instantaneous rate of transition

⁵ The judges were a faculty member and a fourth-year doctoral student, both in strategic management. Neither judge was otherwise involved in the research.

⁶ A hazard rate is an instantaneous probability of transition from one state to another, when the transition has not already occurred. Thus, it is a conditional probability, the condition being that the observation is still "at risk" of the transition. For our study, the condition was that an executive had not already departed.

from the retained state to the departed state. The observation period for our study was the first four years (1,460 days) following an acquisition event. We expected this time frame to encompass essentially all departure behavior directly associated with an acquisition (Walsh, 1988).

To handle the dynamic effects mentioned earlier, we examined several subperiods within the overall 1,460-day interval. Our data set included the time in days between the date of an acquisition and the date of a departure. Our model contains the assumption that the effects of independent variables may vary from subperiod to subperiod within the four-year interval but are consistent within each subperiod. Similarly, the underlying hazard rates were presumed to vary from subperiod to subperiod but to remain uniform within each subperiod.

The model we selected is of the form $R_{ik} = \text{EXP}^{b_k} X_{ik}$ (or alternatively, $\ln(R_{ik}) = b_k' X_{ik}$), where i observations and k subperiods are examined. In this model, R_{ik} is the i th observation's rate of departure during subperiod k , X_{ik} refers to a vector of explanatory variables specific to the i th observation during subperiod k , and b_k refers to a vector of coefficients to be estimated. An appendix, available from the authors upon request, provides further details on our statistical method and parameter selection.

An important issue for the present analysis, and one for which we had little guidance, was the selection of subperiods within the four-year interval. Examination of hazard plots revealed that the first month was a critical, distinct period for departing executives. The first month exhibited a very high rate of departure for acquired executives, and the hazard rate declined sharply thereafter. Thus, we decided to examine the first month as a separate subperiod and to divide the remainder of the observation window into annual subperiods. Comparison of likelihood ratios indicated that the use of those five subperiods yielded a significant improvement ($p < .001$) over use of either a single-period model or a model examining only four annual subperiods.

Technically, the observations are not all independent, since each firm had multiple executives. When we conducted regression analyses at the firm level examining the number of executives departing while controlling for the number of executives present at start of each period ($N = 97$), the results were quite consistent with the results presented here, but they could not meaningfully include the individual-level variables of interest—executive age and status bestowal. We elected to make this more parsimonious presentation rather than use separate tables to report individual- and team-level variables.

For reference, Table 1 shows departure rates by each period, computed on the bases of both the original 430 executives and the number of executives present at the start of each period. Cumulatively, over the four years, 67 percent of the acquired executives departed, a somewhat higher rate than Walsh (1988, 1989) observed (61 percent over five years). The magnitude of this phenomenon reaffirms the importance of the research topic.

TABLE 1
Acquired Executive Departure by Period

Variables	Months Since Acquisition					Total
	0-1	2-12	13-24	25-36	37-48	
Number of executives departing	30	87	76	41	51	285
Percentage of original number departing ^a	7	20	18	10	12	67%
Percentage of executives present at start of period who departed	7	22	24	17	26	

^a N = 430.

RESULTS

Table 2 presents descriptive statistics and correlations among all variables, including dummy variables indicating whether an acquired executive departed within two or four years after an acquisition. The correlations, particularly those based on two-year departure, provide preliminary support for some of our hypotheses. Specifically, two-year executive departure was negatively associated with the acquired firms' preacquisition ROE and even somewhat more associated with their ROE relative to their acquirers'; friendly mergers were associated with the fewest executive departures and contested tender offers with the most; executives who were personally granted status were less likely to depart than were others, but surprisingly, those who were indirectly granted status were more likely to depart; and neither the relative sizes of the acquired firms nor removal of autonomy showed a simple correlation with executive departure. The control variable, executive age, was positively associated with departure, as might be expected. The relatedness control variables showed no association with two-year executive departure. The fact that the indicators of relative standing were somewhat more strongly related to two-year departure than to four-year departure is consistent with our expectation that effects of relative standing on departure would diminish over time.

Table 3 presents results of the multiperiod RATE analysis, delineating the factors associated with acquired executive departure for five subperiods. The overall model is highly significant ($\chi^2 = 187$, $p < .001$). Acquired firm ROE was negatively associated with executive departure through the second year. As hypothesized, the better the preacquisition performance of an acquired firm, the lower the rate of executive departure. The relative size of an acquisition was negatively associated with executive departure in the first month, a finding supporting our hypothesis that executives of companies that are much smaller than their new parents will be likely to depart and consistent with our expectation of a very early effect from size.

The variables indicating the social climate of an acquisition were associated with departure rates. In line with our hypothesis, when a union was a mutually negotiated merger, there was a downward effect on acquired

TABLE 2
Descriptive Statistics and Correlations^a

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Departure within two years	0.45	0.50													
2. Departure within four years	0.66	0.47	.64***												
3. Acquired firm ROE	12.57	5.90	-.12**	-.08											
4. Acquiring firm ROE	15.69	6.40	.07	.02	.18†										
5. Relative ROE	-3.13	7.53	-.15**	-.08	.88***	-.71***									
6. Relative size	59.27	62.27	.03	.02	-.02	-.31**	.24*								
7. Merger	0.52	0.50	-.08*	-.09*	.01	.08	-.07	-.09							
8. Contested tender offer	0.10	0.30	.13**	.10*	.02	.03	.01	.00	-.33**						
9. Removal of autonomy	3.49	1.51	.05	.00	-.08*	-.15	.07	.08	-.08	.07					
10. Personal status bestowal	0.18	0.38	-.18**	-.01	.00	-.04	.04	.14**	.12**	-.11**	.08				
11. Indirect status bestowal	0.33	0.47	.18**	.05	.11*	.06	.03	.21**	.17**	-.13*	-.13*	-.33			
12. Age of executive	55.03	8.36	.15**	.13**	.05	.09*	-.04	.01	-.01	-.07	-.05	-.02	-.05		
13. Horizontally related firms	0.21	0.41	-.08	-.07	-.24*	-.17	-.02	.05	.36**	-.09	.25*	.06	-.08	-.08	
14. Unrelated firms	0.34	0.47	.01	-.01	.24*	.06	.22*	.14	-.13	.09	-.20†	-.01	.07	-.07	-.33**

^a N = 430 for individual-level variables; N = 97 for organization level variables. Correlations that include individual-level variables are based on N = 430.

* p < .05

** p < .01

*** p < .001

TABLE 3
Summary of Hypotheses and Maximum Likelihood Estimates of the Determinants of Departure

Variables	Expected Sign	Expected Timing	Months Since Acquisition				
			0-1	2-12	13-24	25-36	37-48
Intercept			-10.050***	-8.941***	-10.070***	-8.911***	-6.935***
Acquired firm ROE	Negative	Very pronounced year one effect; still significant years two and three	-0.084**	-0.022*	-0.050**	-0.014	-0.011
Relative size	Negative	Year one effect only	-0.007*	-0.002	0.002	-0.003	0.001
Merger	Negative	Significant years one-three	-0.163*	-0.342*	-0.003	0.347	-0.660*
Contested tender offer	Positive	Very pronounced year one effect; still significant years two and three	0.986*	0.712**	0.612*	-0.271	0.464
Removal of autonomy	Positive	Significant years two and three	0.370**	0.182**	-0.009	0.066	-0.231*
Personal status	Negative	Significant years one-three	-8.732	-1.721**	0.264	-0.561	1.226***
Indirect status	Negative	Significant years one-three	0.810*	0.542*	0.856**	-0.626	0.351
bestowal							
Age of executive			0.072**	0.028*	0.051***	0.035*	-0.001
Horizontally related firms			-1.268**	-0.010	0.248	-0.639*	0.542
Unrelated firms			0.844*	-0.195	0.223	-0.207	-0.073
Model logarithmic likelihood	-2,233						
Model chi-square	187***						
df	54						
Number of observations	430						

* $p < .05$ ** $p < .01$ *** $p < .001$

executive departures. Our expectation was that we would find a steadily enduring effect, but significance emerged only in the first and fourth years. When an acquisition was hostile—a contested tender offer—there was, as hypothesized, a significant, positive effect on executive departures; the effect persisted throughout the first two years, not extending into the third year as we had expected, and the early pronounced effect we had anticipated was absent.

The removal of autonomy had significant but mixed associations with executive departure. In the first two time periods—the first month and the rest of the first year—the removal of autonomy was positively associated with departure, as hypothesized. However, this was an earlier effect than we anticipated. In the fourth year, the relationship was reversed: removal of autonomy was negatively associated with departure. This reversal of sign, which we will attempt to interpret in our discussion section, provides one of several examples of the importance of dynamically modeling acquired executive departure.

Table 3 also shows strong results for the variables associated with status bestowal. The finding that executives who personally received high status in a postacquisition firm were significantly less likely to depart in the first year than were executives who did not receive such status was as hypothesized; but again, the phenomenon occurred earlier and more briefly than we had anticipated. However, in the fourth year a reversal occurred: Executives who had been bestowed status were more likely to depart.

For executives who indirectly acquired status by having peers who were granted it, the results were strong but contrary to hypothesis. For each of the first three periods, these executives were significantly more likely to depart than were executives in companies in which no one received enhanced status.

Among the control variables, executive age was positively associated with departure in each subperiod through the third year. The relatedness variables yielded results quite contrary to prevailing theory. Horizontally related acquisitions—unions of firms that might be considered the most highly related—had relatively low departure rates in the first month and the third year. Unrelated acquisitions had relatively high departure rates in the first month. In these cases, the omitted comparison category was nonhorizontally related acquisitions.

We turn now to examination of our hypothesis that the relative preacquisition ROE of the acquired firms (acquired ROE minus acquiring ROE) would be more strongly associated with acquired executive departure than would be the acquired firms' ROE alone. When the RATE analysis was redone with relative ROE replacing acquired ROE, the overall chi-square increased from 187 to 194 (Table 4). Although RATE analysis does not allow a direct test of differences in chi-squares when one model is not a subset of another, the seven-point increase is consistent with the view that the capabilities of an acquired firm's executives are not seen in isolation, but rather in the context of the acquiring firm's performance. However, we pursued yet another analysis, which allowed more rigorous conclusions.

To ascertain the effects of each company's performance on acquired executive departure, we conducted a RATE analysis in which both performance measures were included. The results, also shown in Table 4 (model 3), reaffirm the negative relationship between acquired firm preacquisition ROE and acquired executive departures over the first two years after acquisition. Moreover, the acquiring firms' preacquisition performance is positively associated with acquired executive departure in the first three years, although the association is lacking in the first month. A likelihood ratio test indicated that model 3 in Table 4 is significantly stronger ($p < .025$) than model 1, in which only acquired firm ROE was included. This rigorous comparison is allowed because one model is a direct subset of the other.

Figure 1 illustrates the chief pattern of these results, showing two-year departure rates for both acquired ROE quintiles and acquiring ROE quintiles. In general, the lower the performance of an acquired firm, the higher the rate of departure of acquired executives in the first two years. And the lower the performance of the acquiring firm, the lower the rate of acquired executive departures. This combined pattern supports the conclusion that the conditions confronting acquired executives, including possibly their relative standing, are in part the result of the performance of the acquired firm relative to that of the acquiring firm.

Thus, models 2 and 3 provide support for our hypothesis that executive departure depends more on an acquired company's performance relative to the acquiring company's than on the acquired company's performance alone. Results partially bore out our expectations regarding the timing of these performance effects. There was, as expected, an effect beyond the first year; however, even though the early effects were highly significant, they were not particularly pronounced compared to the subsequent effects.

As noted, we also explored, without hypothesis, the question of whether adjusting the performance of the acquired and acquiring firms for industry would strengthen explanations of acquired executive departure. The use of ROEs adjusted for industry averages (models 4, 5, and 6, Table 4) yielded consistently smaller chi-squares than the use of unadjusted ROE measures in the corresponding models (1, 2, and 3).

Although we cannot say that models 4, 5, and 6 are significantly weaker than models 1, 2, and 3 (because the set of models is not nested), this much can be said: industry performance does not add any explanatory power beyond that achieved from unadjusted company ROEs. If perceptions of superiority and inferiority are an operative mechanism behind acquired executive departure, as we posited, it appears that those perceptions are derived without special regard to industry conditions.

Finally, we turn to evidence in partial support of our overall temporal proposition. As expected, our indicators of relative standing were, in the aggregate, pervasively and highly related to executive departure in the first postacquisition year. For example, as Table 3 shows, six of our seven independent variables (excluding the control variables) were significantly associated with departure in the first postacquisition month and in the rest of the

TABLE 4
Results for Alternative Performance Measures^a

Model	Performance Measures Included	Months Since Acquisition					Overall Model Chi-Square
		0-1	2-12	13-24	25-36	37-48	
1	Acquired firm ROE	-.084**	-.022*	-.050**	-.014	-.011	187***
2	Relative ROE	-.053**	-.027*	-.056***	-.048*	-.017	194***
3	Acquired firm ROE	-.082**	-.027*	-.066**	.015	.003	203***
	Acquiring firm ROE	-.013	.027*	.048*	.079**	.025	
4	Acquired firm ROE, industry adjusted	.071	-.041*	-.052*	.012	-.025	178***
5	Relative ROE, industry adjusted	.036	-.025	-.058***	.001	-.036	188***
6	Acquired firm ROE, industry adjusted	.071	-.039*	-.051*	.012	-.030	190***
	Acquiring firm ROE, industry adjusted	-.024	.012	.081	.006	.039	

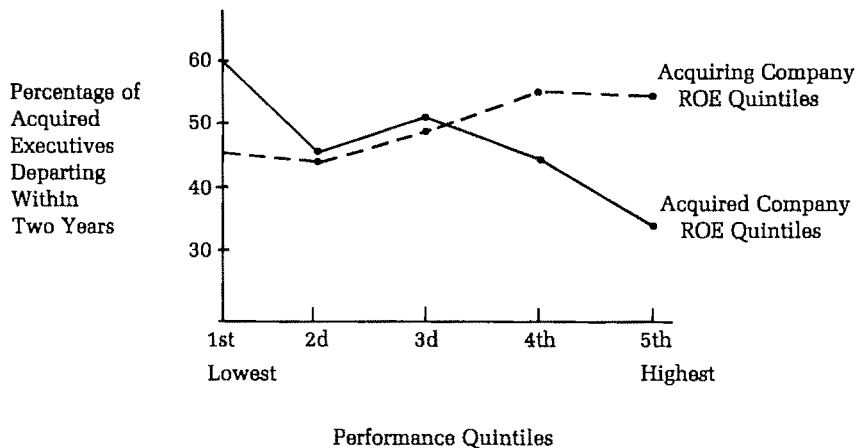
^a Coefficients for performance measures were extracted from overall multivariate RATE models like those presented in Table 3. None of the other independent variables changed in sign or significance when alternative performance measures were used.

* $p < .05$

** $p < .01$

*** $p < .001$

FIGURE 1
Departure of Acquired Executives by Acquired and Acquiring Company
Preacquisition Performance



first year. Then, in line with our expectations, such indications of significance diminished. In year two, three of the relationships were significant, and in year three none were significant, although relative ROE was significant in year three (Table 4). These results thus suggest an earlier end to the implications of relative standing for executive departure than we had anticipated. Results for year four, however, complicate this interpretation. The significant downward effects of friendly mergers on departure rates re-emerged in the fourth year, and two other variables were significant as well. However, these two variables—removal of autonomy and direct status bestowal—had signs that were opposite their earlier (and hypothesized) signs, thus suggesting that the circumstances surrounding an acquisition create one set of social dynamics early on and a very different and unexpected set of dynamics later.

DISCUSSION

In this article, we have developed a new explanation of why the executives of acquired firms will stay or leave: their relative standing in the newly combined firms (Frank, 1985). According to this line of thought, some acquisitions result in very low relative standing for acquired executives—they feel inferior, the acquirers see them as inferior and themselves as superior, autonomy is removed, status is removed, and a climate of acrimony prevails. When these conditions exist, the rate of acquired executive departure will be great.

Our results generally support our theory. For example, the worse the preacquisition performance of an acquired firm, the greater the rate of executive departure; however, the performance of the acquiring firm was addi-

tionally predictive of acquired executive departure, suggesting that perceptions and behaviors of superiority and inferiority are calibrated on the basis of both firms' performances. Where the gap between them is large, acquired executives are particularly likely to depart, possibly because of a variety of intervening factors: self-doubt about their capabilities and prospects in the combined firm, denigration and status degradation at the hands of the acquiring executives, and outright dismissal.

Interestingly, our evidence suggests that industry performance is not additionally taken into account when executives create and act on their beliefs about superiority and inferiority. In this finding, we have further indication of the general tendency to attribute performance directly to a firm's senior executives (Meindl et al., 1985). So, for example, executives in a firm that has been performing poorly, but not as poorly as its depressed industry, should not expect particularly gracious or accommodating treatment after being acquired.

Other indicators of relative standing were also associated with acquired executive departure as predicted. We expected the degree of acrimony associated with an acquisition event to affect the relative standing of the acquired executives; and indeed, friendly mergers led to low departure rates, but contested tender offers were followed by high departure rates. The removal of autonomy from individuals accustomed to great autonomy was another indicator of status degradation that was associated with executive departure. The removal of autonomy signals loss, but it also indicates an attempted integration with an acquiring firm and its executives. This coordination increases the amount of postacquisition interaction between the acquiring and acquired executives, probably in turn increasing the antagonisms between the two groups.

In line with our theory, executives who were personally granted status in a postacquisition firm were relatively unlikely to depart. Thus, attempts to minimize status degradation for acquired executives help to influence their continued employment. However, it is of great note that acquired executives who were denied status enhancement while one or more of their colleagues received it were highly likely to depart. This result suggests that the relative standing of an acquired executive has two facets: there is standing relative to acquiring executives and standing relative to fellow acquired executives. As a stressful, disruptive event, acquisition should reasonably be expected to generate internal jealousies and feelings of betrayal among the members of an acquired firm (Adams, 1965). Acquiring firms may need to be very vigilant to prevent unintended strains that can result from bestowing status on only a subset of acquired executives.

Our control variables also showed significant associations with acquired executive departure. Executive age was positively related to departure, probably indicating actuarial phenomena—illnesses, deaths, mandatory retirements—as well as a relative readiness among older executives to conclude their careers rather than deal with postacquisition tensions.

The relatedness of an acquisition yielded results counter to prevailing

expectations. Horizontally related acquisitions, which can be considered unions of highly related firms, had low departure rates, and unrelated acquisitions had high departure rates, particularly in the first month after acquisition. Again, prevailing theory would suggest that an acquiring firm would strive to retain acquired executives to the extent it lacked familiarity with the acquired business. But what may occur, in contrast, is a cultural gap in positive proportion to the unrelatedness of an acquisition, a gap that creates real and anticipated strains between the two parties (Chatterjee et al., 1992). Since an acquiring firm's culture will generally dominate, in this finding we may have one more variation of the phenomenon of relative standing: the greater the cultural gap between the acquired and acquiring firms, the greater the diminishment of the acquired executives, and the greater their rate of departure.

Our analytic method allowed us to observe the dynamic influence of our several independent variables on executive departure over time. At the most fundamental level, we found that a disproportionate number of executives leave within the first month after an acquisition, and a model that distinctly examines that first month has greater explanatory power than a model that simply examines four one-year periods. This finding in turn suggests that researchers or executives who might wish to alter departure rates must be prepared to focus on very early events, possibly even on factors preceding the actual consummation of an acquisition (Hitt et al., 1990; Jemison & Sitkin, 1986).

Illuminating timing more specifically, our results indicate that the pre-acquisition performance of an acquired firm relative to that of its acquiring firm has a persistent effect on acquired executive departure through the third year after an acquisition. This effect thus persists longer than some observers might expect preacquisition performance to be salient to either party, possibly suggesting very protracted beliefs about the adequacy or inadequacy of the acquired executives. Conversely, the relative size of an acquisition is significantly negatively related to departure only in the first month, suggesting that executives in relatively small acquisitions conclude at the very outset that they do not want to be small frogs in a large pond. The social climate of the acquisition process has effects that last well beyond the closing of the deal. In cases of friendly merger, executive departure is negatively affected throughout the first year and then again in the fourth year. In cases of hostile takeover, executive departures are high over two full years. Thus, each variable has its own temporal dynamics.

Especially intriguing are the most delayed effects—the significant determinants of departure in the fourth year after acquisition. Here, we found that the friendliness of a merger once again has a downward influence on departure rates. However, direct status bestowal, which is negatively related to departure in the early periods, has a positive effect in the fourth year. This may indicate that some acquired executives are treated graciously until an acquisition is stabilized, and then they are released—a pattern Siehl and colleagues described as part of their “love and marriage” metaphor (1990:

52). Also, in the fourth year after an acquisition, the removal of autonomy has a negative effect on departure: the less that autonomy has been removed, the higher the rate of departure. This result is difficult to interpret but may indicate that acquired executives who retain autonomy are held more fully accountable for postacquisition performance; if performance is low (which some research indicates is often the case for acquisitions), the acquired executives who were granted autonomy face a form of settling-up in the fourth year.

Such interpretations of course are speculative. More broadly, we conclude that acquisitions have some quite delayed and lingering effects on executive relationships, attributions, and behaviors. The circumstances that surround an acquisition event seem to emerge—or sometimes reemerge after a seeming dormancy—in significant and unexpected ways as long as four years after it, and may endure even longer.

Our own understanding of the actual sequence and timing of various postacquisition beliefs and behaviors is necessarily limited by the archival nature of our data. However, we have revealed significant patterns, varying over time, that may help guide future clinical studies of relations between acquired and acquiring executives.

We leave unexamined at this point the question of whether acquired executive departure is of any consequence to the performance of an acquired firm. As discussed earlier, arguments have been made on both sides, but systematic data have not been set forth. However, acquisitions commonly do not yield the returns the acquirers expected (Fowler & Schmidt, 1988; Ravenscraft & Scherer, 1988), and it may be that the unexpected and unwanted departure of acquired executives plays an important role in the poor performance of many acquisitions. On the other hand, the departure of executives from poorly performing firms may be beneficial to acquisition performance. An improved understanding of why departure occurs, such as is enabled by focusing on the concept of relative standing, may yield substantial theoretical and practical benefits.

Although suggestive, our study has limitations. Most notably, it examined the conditions that create perceptions of relative standing, but it did not gauge the perceptions themselves. Field research needs to be conducted to investigate the actual organizational byplay that accompanies each of the indicators of postacquisition relative standing we examined. For example, when the preacquisition performance of an acquired firm is low relative to its acquirer's, how do the two sets of executives perceive themselves and each other? How are interactions characterized? What types of policies are adopted for dealing with the acquired firm? Similar in-depth research on other determinants of relative standing is needed as well. And, even though we have deemphasized the distinction between voluntary and involuntary departure, believing that they are causally and empirically intertwined, more clinical future studies may be able to benefit from examining the two types.

Another related avenue of research would be to examine the financial aspects of the relative standing of acquired executives. The compensation of acquired executives relative both to their preacquisition pay and to acquiring executive pay would significantly influence perceptions of relative standing and departure. Similarly, it would be interesting to examine the types of positions and compensation secured by acquired executives who depart. Such examination might provide insight into the conditions of their departures and their valuation of social standing.

Beyond consideration of relative standing, paying attention to acquiring firms' motives and experiences may help advance understanding of acquired executives' departure. The executive labor market, executive wealth, and golden parachute provisions are also potentially important issues that have fallen outside our scope.

In short, much more needs to be known about the departure of acquired executives. Hirsch (1986) described the stresses and strains that accompany acquisitions; Walsh (1988) documented the tendency of acquired executives to depart; and Haspeslagh and Jemison (1991) presented an in-depth analysis of the management of acquisitions in which human and social factors figure prominently. In the 1980s, 24,000 acquisitions and mergers were executed in the United States alone. Although observers may never again see such a level of activity, acquisitions represent a strategic option that will continue to be prevalent. Vast amounts of economic and human resources are at stake. A better understanding of the causes of postacquisition outcomes will reduce the risks and improve the management of acquisitions to the benefit of both those directly involved and the greater economy.

REFERENCES

- Adams, J. S. 1965. Inequity in social exchange. In L. Berkowitz (Ed.), *Advances in social psychology*, vol. 2: 267–299. New York: Academic Press.
- Amihud, Y., & Lev, B. 1981. Risk reduction as a managerial motive for conglomerate mergers. *Bell Journal of Economics*, 12: 605–616.
- Bantel, K. A., & Jackson, S. E. 1989. Top management and innovations in banking: Does the composition of the top team make a difference? *Strategic Management Journal*, 10: 107–124.
- Bleeke, J. A., & Daniels, L. K. 1985. After a deal is completed: How far and how fast to move. *California Management Review*, 30 (Fall): 9–11.
- Bradley, M., Desai, A., & Kim, E. H. 1983. The rationale behind interfirm tender offers: Information or synergy? *Journal of Financial Economics*, 11: 183–206.
- Buono, A. F., Bowditch, J. L., & Lewis, J. W. 1985. When cultures collide: The anatomy of a merger. *Human Relations*, 38: 477–500.
- Chatterjee, S. 1986. Types of synergy and economic value: The impact of acquisitions on merging and rival firms. *Strategic Management Journal*, 7: 119–140.
- Chatterjee, S., Lubatkin, M. H., Schweiger, D. M., & Weber, Y. 1992. Cultural differences and shareholder value in related mergers: Linking equity and human capital. *Strategic Management Journal*, 13: 319–334.

- Chen, C. C., & Meindl, J. R. 1991. The construction of leadership images in the popular press: The case of Donald Burr and People Express. *Administrative Science Quarterly*, 36: 521-551.
- Cohen, B. P., & Zhou, X. 1991. Status processes in enduring work groups. *American Sociological Review*, 56: 179-188.
- Costello, T. W., Kubis, J. G., & Shaffer, C. L. 1963. An analysis of attitudes toward a planned merger. *Administrative Science Quarterly*, 8: 235-249.
- Datta, D. K., & Grant, J. H. 1990. Relationships between type of acquisition, the autonomy given to the acquired firm, and acquisition success: An empirical analysis. *Journal of Management*, 16: 29-43.
- Fama, E. F. 1980. Agency problems and the theory of the firm. *Journal of Political Economy*, 88: 288-307.
- Fama, E. F., & Jensen, M. C. 1983. Separation of ownership and control. *Journal of Law and Economics*, 26: 301-325.
- Festinger, L. 1954. A theory of social comparison processes. *Human Relations*, 7: 117-140.
- Finkelstein, S., & Hambrick, D. C. 1990. Top-management-team tenure and organizational outcomes: The moderating role of managerial discretion. *Administrative Science Quarterly*, 35: 484-503.
- Fowler, K. L., & Schmidt, D. R. 1988. Tender offers, acquisitions, and subsequent performance. *Academy of Management Journal*, 31: 962-974.
- Frank, R. H. 1985. *Choosing the right pond: Human behavior and the quest for status*. New York: Oxford University Press.
- Gephardt, R. P., Jr. 1978. Status degradation and organizational succession: An ethnomethodological approach. *Administrative Science Quarterly*, 23: 553-581.
- Grusky, O. 1969. Managerial succession and organizational effectiveness. In A. Etzioni (Ed.), *A sociological reader in complex organizations* (2d ed.): 398-410. New York: Holt, Rinehart & Winston.
- Hambrick, D. C. 1989. Putting top managers back into the strategy picture. *Strategic Management Journal*, 10 (Special Issue): 5-16.
- Hambrick, D. C., & Finkelstein, S. 1987. Managerial discretion: A bridge between polar views of organizational outcomes. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior*, vol. 9: 369-406. Greenwich, CT: JAI Press.
- Haspeslagh, P. C., & Jemison, D. B. 1991. *Managing acquisitions: Creating value through corporate renewal*. New York: Free Press.
- Hayes, R. H., & Hoag, G. H. 1974. Post-acquisition retention of top management. *Mergers & Acquisitions*, 9(2): 8-18.
- Hirsch, P. M., & Andrews, J. A. Y. 1983. Ambushes, shootouts, and knights of the roundtable: The language of corporate takeovers. In L. Pondy, P. Frost, G. Morgan, & T. Dandridge (Eds.), *Monographs in organizational behavior and industrial relations*, vol. 1: *Organizational symbolism*: 145-155. Greenwich, CT: JAI Press.
- Hirsch, P. M. 1986. From ambushes to golden parachutes: Corporate takeovers as an instance of cultural framing and institutional integration. *American Journal of Sociology*, 91: 800-837.
- Hirschman, A. O. 1970. *Exit, voice, and loyalty*. Cambridge, MA: Harvard University Press.
- Hitt, M. A., Hoskisson, R. E., & Ireland, R. D. 1990. Mergers and acquisitions and managerial commitment to innovation in M-form firms. *Strategic Management Journal*, 11 (Special Issue): 29-47.

- Jemison, D. B., & Sitkin, S. B. 1986. Corporate acquisitions: A process perspective. *Academy of Management Review*, 11: 145–163.
- Jensen, M. C. 1988. The takeover controversy: Analysis and evidence. In J. C. Coffee, Jr., L. Lowenstein, & S. Rose-Ackerman (Eds.), *Knights, raiders, and targets: The impact of the hostile takeover*: 314–354. New York: Oxford University Press.
- Jensen, M. C., & Meckling, W. H. 1976. Theory of the firm: Managerial behavior, agency costs, and ownership structure. *Journal of Financial Economics*, 3: 305–360.
- Kalbfleisch, J. D., & Prentice, R. L. 1980. *The statistical analysis of failure time data*. New York: Wiley.
- Kimberly, J. R., & Evanisko, M. J. 1981. Organizational innovation: The influence of individual, organizational, and contextual factors on hospital adoption of technological and administrative innovations. *Academy of Management Journal*, 24: 689–713.
- Levinson, H. 1970. A psychologist diagnoses merger failure. *Harvard Business Review*, 48(2): 139–147.
- Levinson, H. 1973. *The great jackass fallacy*. Boston: Harvard University Graduate School of Business Administration.
- Long, W. F., & Ravenscraft, D. J. 1984. The misuse of accounting rates of return: Comment. *American Economic Review*, 74: 494–500.
- McEachern, W. A. 1975. *Managerial control and performance*. Lexington, MA: Lexington Books.
- Machiavelli, N. 1966. *The prince*. New York: Bantam Books.
- Magenheim, E. B., & Mueller, D. 1988. Are acquiring firm shareholders better off after an acquisition? In J. C. Coffee, Jr., L. Lowenstein, & S. Rose-Ackerman (Eds.), *Knights, raiders, and targets: The impact of the hostile takeover*: 171–193. New York: Oxford University Press.
- Manne, H. G. 1965. Mergers and the market for corporate control. *Journal of Political Economy*, 73: 110–120.
- March, J. G., & Simon, H. 1958. *Organizations*. New York: Wiley.
- Meindl, J. R., Ehrlich, S. B., & Dukerich, J. M. 1985. The romance of leadership. *Administrative Science Quarterly*, 30: 78–102.
- Pfeffer, J. 1981. Management as symbolic action: The creation and maintenance of organizational paradigms. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, vol. 3: 1–52. Greenwich, CT: JAI Press.
- Pitts, R. A. 1976. Diversification strategies and organizational policies of large diversified firms. *Journal of Economics and Business*, 28: 181–188.
- Porter, M. E. 1987. From competitive advantage to corporate strategy. *Harvard Business Review*, 65(3): 43–57.
- Ravenscraft, D. J., & Scherer, F. M. 1988. Mergers and managerial performance. In J. C. Coffee, Jr., L. Lowenstein, & S. Rose-Ackerman (Eds.), *Knights, raiders, and targets: The impact of the hostile takeover*: 194–210. New York: Oxford University Press.
- Roll, R. 1986. The hubris hypothesis of corporate takeovers. *Journal of Business*, 59: 197–216.
- Salter, M. S., & Weinhold, W. A. 1979. *Diversification through acquisition: Strategies for creating economic value*. New York: Free Press.
- Salter, M. S., & Weinhold, W. A. 1988. Corporate takeovers: Financial boom or organizational bust? In J. C. Coffee, Jr., L. Lowenstein, & S. Rose-Ackerman (Eds.), *Knights, raiders, and targets: The impact of the hostile takeover*: 135–149. New York: Oxford University Press.

- Scherer, F. M. 1986. Mergers, sell-offs, and managerial behavior. In L. G. Thomas (Ed.), *The economics of strategic planning*: 143–170. Lexington, MA: Lexington Books.
- Schweiger, D. M., Ivancevich, J. M., & Power, F. R. 1987. Executive actions for managing human resources before and after acquisition. *Academy of Management Executive*, 1(2): 127–138.
- Shrout, P. E., & Fleiss, J. L. 1978. Intraclass correlations: Uses in assessing rater reliability. *Psychological Bulletin*, 86: 420–428.
- Siehl, C., Smith, D., & Omura, A. 1990. After the merger: Should executives stay or go? *Academy of Management Executive*, 4(1): 50–60.
- Tajfel, H., & Turner, J. 1979. An integrative theory of intergroup conflict. In W. G. Austin & S. Worchel (Eds.), *The social psychology of intergroup relations*: 33–47. Belmont, CA: Wadsworth.
- Trautwein, F. 1990. Merger motives and merger prescriptions. *Strategic Management Journal*, 11: 283–296.
- Tuma, N. B. 1980. *Invoking RATE*. Stanford, CA: Stanford University.
- Tuma, N. B., & Hannan, M. T. 1984. *Social dynamics: Models and methods*. New York: Academic Press.
- Virany, B., Tushman, M., & Romanelli, E. 1992. Executive succession and organization outcomes in turbulent environments: An organizational learning approach. *Organization Science*, 3: 72–91.
- Wagner, W. G., Pfeffer, J., & O'Reilly, C. A., III. 1984. Organizational demography and turnover in top management groups. *Administrative Science Quarterly*, 29: 74–92.
- Walsh, J. P. 1988. Top management turnover following mergers and acquisitions. *Strategic Management Journal*, 9: 173–183.
- Walsh, J. P. 1989. Doing a deal: Merger and acquisition negotiations and their impact upon target company top management turnover. *Strategic Management Journal*, 10: 307–322.
- Walsh, J. P., & Ellwood, J. W. 1991. Mergers, acquisitions, and the pruning of managerial deadwood: An examination of the market for corporate control. *Strategic Management Journal*, 12: 201–218.
- Withey, M. J., & Cooper, W. H. 1989. Predicting exit, voice, loyalty, and neglect. *Administrative Science Quarterly*, 34: 521–539.

Donald C. Hambrick (Ph.D., Pennsylvania State University) is the Samuel Bronfman Professor of Democratic Business Enterprise at Columbia University and the 1992–93 President of the Academy of Management. His research interests are executive leadership, composition, and processes of top management teams, and strategic reward systems.

Albert A. Cannella, Jr. is an assistant professor of strategic management at Texas A&M University. He received his Ph.D. degree in strategic management from Columbia University in 1991. His research interests are centered on executives, and include executive succession, corporate governance, and how executives influence organizational outcomes.

SUCCESSION AS A SOCIOPOLITICAL PROCESS: INTERNAL IMPEDIMENTS TO OUTSIDER SELECTION

ALBERT A. CANNELLA, JR.

Texas A&M University

MICHAEL LUBATKIN

University of Connecticut and Groupe ESC Lyon

Although traditional adaptive theory implies that poor organizational performance will directly increase the likelihood that an outsider will be selected to succeed a firm's chief executive, we develop theory to suggest that sociopolitical forces, such as the presence or absence of an heir apparent and the incumbent's ability to influence the selection decision, will decouple the performance-selection relationship. We predict that poor performance will lead to outsider selection only when sociopolitical forces are weak. Further, we consider the effects of both return and risk on outsider selection. Empirical evidence from 472 succession events in large, publicly traded firms supports our hypotheses about moderating sociopolitical forces.

A widely held belief among organizational and management theorists is that poor performance increases the likelihood that a new chief executive officer (CEO) will be selected from outside an organization because outsiders are perceived as more able than insiders to initiate and implement strategic changes (Furtado & Karan, 1990; Vancil, 1987; Walsh & Seward, 1990). Interestingly, little empirical evidence has been presented to support the argument that outsider selection is widely used as an adaptive mechanism. For example, both Dalton and Kesner (1985) and Friedman and Singh (1989) reported that organizations performing poorly are no more likely to select outsider successors than are those performing well. Indeed, Dalton and Kesner (1985) reported that outsider selection occurred only among organizations characterized by "midrange" performance. They interpreted this unexpected finding as evidence that an array of factors that have little to do with firm-level performance influence the selection decision. These sociopolitical factors can lead directors to select an insider candidate even when the need for substantial strategic change is apparent. Other researchers have articulated similar viewpoints (Boeker & Goodstein, 1991; Fredrickson, Hambrick, & Baumrin, 1988; Friedman & Singh, 1989; Furtado & Karan, 1990; Miller, 1991; Puffer & Weintrop, 1991; Walsh & Seward, 1990).

We gratefully acknowledge the helpful comments of Thomas Turk, Robert Hoskisson, Richard D'Aveni, and Donald Hambrick on earlier versions of this article.

Our study falls into the first of the three broad categories of succession studies Furtado and Karan (1990) identified in their extensive review of the succession literature. The three categories are studies addressing the causes of succession (e.g., Dalton & Kesner, 1985; Fredrickson et al., 1988; Grusky, 1961; Puffer & Weintrop, 1991), those addressing the consequences of succession (e.g., Helmich & Brown, 1972; Pfeffer & Davis-Blake, 1986; Smith, Carson, & Alexander, 1984), and those addressing the shareholder wealth effects associated with succession (e.g., Lubatkin, Chung, Rogers, & Owers, 1989; Friedman & Singh, 1989; Reinganum, 1985). We proposed and then tested a conceptual framework intended to capture both organizational performance and sociopolitical influences on selection decisions. Our framework draws heavily from Fredrickson and colleagues' (1988) sociopolitical model of CEO dismissal but extends that model to the domain of CEO selection. The central thesis of the current study is that when an outgoing CEO has influence with directors, or when directors have committed to an heir apparent, performance will be decoupled from the selection decision. Conversely, when the outgoing CEO has little influence and directors have not committed to an heir apparent, poor performance will be associated with outsider selection. We also argue that at least two performance-related factors influence the succession decision: risk, or the uncertainty associated with a firm's income stream, and return.

THEORY AND HYPOTHESES

The Performance Context of Succession

Are succession decisions influenced by the performance context in which they occur? A review of the literature on the subject of succession suggests several viewpoints. According to the adaptive, or rational, view of organizations and environments, the answer is yes. Proponents of this view argue that organizations change, or adapt, in response to environmental challenges and that executive selection decisions represent an important adaptation mechanism (Friedman & Singh, 1989; Goodstein & Boeker, 1991; Lubatkin et al., 1989; Pfeffer & Davis-Blake, 1986; Pfeffer & Salancik, 1978: 225–256). Consistent with the adaptive view is a large amount of empirical evidence that poor performance increases the likelihood of a succession event (Coughlan & Schmidt, 1985; Gilson, 1989; Grusky, 1961, 1963; James & Soref, 1981; McEachern, 1975; Morck, Schleifer, & Vishny, 1989; Puffer & Weintrop, 1991; Schwartz & Menon, 1985; Warner, Watts, & Wruck, 1988).

Also consistent with the adaptive view is the argument that when performance is poor, directors will favor outside candidates, because outsiders are perceived to be more capable of changing the mission, objectives, and strategy of an organization than are insiders (Bibeault, 1982; Faith, Higgins, & Tollison, 1984; Grusky, 1961; Hofer, 1980; Starbuck, Greve, & Hedberg, 1978; Virany, Tushman, & Romanelli, 1992; Walsh & Seward, 1990). There are at least two reasons for this belief. First, outsider successors are not likely

to be as committed to a firm's ongoing strategies as insiders, since the outsiders were not personally involved in the selection of those strategies. Outsiders therefore can more objectively evaluate the firm's ongoing strategies and initiate appropriate changes (Bibeault, 1982; Goodstein & Boeker, 1991; Hofer, 1980; Starbuck et al., 1978; Miller, 1991).

Second, outsiders are unlikely to recognize or honor the implicit agreements and understandings that exist among organization members and between organization members and external stakeholders (Faith et al., 1984; Romanelli & Tushman, 1988; Virany et al., 1992). As Schleifer and Summers (1988) pointed out, organizations are rife with these "implicit contracts." Directors therefore are more likely to select outsiders when performance is poor because they perceive a need for discontinuous change in strategy (Lorsch & MacIver, 1989; Vancil, 1987; Walsh & Seward, 1990). But during times of good performance, directors will prefer promoting an insider, because an insider is likely to be less disruptive to ongoing organizational processes (Carroll, 1984; Grusky, 1961; Helmich & Brown, 1972; Kotin & Sharif, 1967).

As noted initially, the adaptive view of outsider selection has received little empirical support, in spite of its appealing rationale. Dalton and Kesner (1985), Friedman and Singh (1989), and Furtado and Karan (1990) all reported no evidence, statistical or descriptive, to suggest that poor performance leads to outsider selection.

A second view of selection, the inertial view, provides an alternative rationale that may explain the lack of empirical support for the adaptive view of outsider selection. Proponents of the inertial view believe that the selection process is relatively unadaptive because of the large number of persons and vested interests involved (Child, 1972; Hannan & Freeman, 1984; Lieberman & O'Connor, 1972). Stated differently, environments tend to be dynamic, but organizations, particularly large ones, tend to resist change. Even when faced with poor performance, large organizations may cling to outdated strategies and administrative forms and resist outsider selections. Thus, directors tend to choose insider candidates, even when confronted with poor performance (Goodstein & Boeker, 1991; Miller, 1991). Thus, the link between organizational performance and outsider selection is weakened.

Gamson and Scotch (1964) proposed a variant of the inertial view, scapegoating. They argued that the true power in baseball teams lies with owners and general managers, not field managers. When performance declines, owners and general managers scapegoat field managers by dismissing them. Scapegoating offers another explanation as to why many studies have found that poor performance leads to successions, but not necessarily to outsider selections. In a novel extension of the scapegoating theory, Boeker (1992) provided evidence that powerful CEOs, when confronted with poor performance, may try to deflect the blame onto weaker subordinates, who are then dismissed while the CEO remains. Scapegoating therefore conforms

to the inertial view in that powerful interests in a firm are able to divert blame for poor performance onto the less powerful, thereby satisfying external demands for action without challenging the strategic status quo.

As with the adaptive view, however, the predictive validity of the inertial view has been questioned, at least for established firms. Pfeffer and Salancik (1978) observed persistence over long periods of time among large organizations rather than a high incidence of business failures. Thus, although large, well-established organizations may exhibit inertia, or an inability to change quickly, they also tend to have sufficient slack to allow them to survive long periods of poor performance (Hannan & Freeman, 1988). Powerful actors in a firm may use this slack, as long as it remains, to maintain their positions even in the face of poor performance (Goodstein & Boeker, 1991; Miller, 1991). This resource dependence-based argument is completely consistent with Jensen's (1986) discussion of free cash flow, in which he suggested that excess shareholder resources are used to serve managerial interests. The power structure in a firm may shift, however, as slack is used up, with more power going to those who are able to deal with current critical contingencies. Indeed, there is much evidence that large firms do change, albeit at a slower pace than smaller firms (Hannan & Freeman, 1984). Thus, large, established firms are not necessarily inertial. To summarize, outsider selection may imply immediate and discontinuous change, but insider selection can also imply change, at a slower pace (Goodstein & Boeker, 1991).

Given that neither the adaptive nor the inertial view has been able to explain outsider selection, a contingency view, based on a sociopolitical approach to the CEO succession process, has gained recent attention (Fredrickson et al., 1988; Goodstein & Boeker, 1991; Miller, 1991; Morck et al., 1989; Puffer & Weintrop, 1991; Sonnenfeld, 1988; Vancil, 1987; Walsh & Seward, 1990). Advocates of this view suggest that several sociopolitical influences moderate the relationship between performance and director decision making, causing the directors of different firms to react differently to similar performance information.

The Moderating Influence of the Sociopolitical Context

Fredrickson and colleagues (1988) proposed a model in which social and political factors are used to predict the likelihood of a CEO's dismissal. Their central premise was that the link between an organization's performance and its directors' decision to dismiss an incumbent CEO is not direct but rather is moderated by four constructs: director expectations and attributions, director allegiances and values, the power of the incumbent CEO, and the availability of alternative candidates for the CEO position. In the following discussion, we propose a sociopolitical framework of CEO selection based on the first three of the four constructs in the Fredrickson model. We did not consider the last, the availability of alternative candidates, because data on that construct were not accessible.

Incumbent disposition. Since Zald's (1965) detailed description of a

selection decision appeared, researchers have noted that incumbent CEOs often exert a strong influence on director belief structures and decision processes. In our conceptualization, an incumbent's disposition indicates the influence that the incumbent may have on two sociopolitical constructs: director allegiances and values, and director expectations and attributions. For example, directors may feel allegiance to the incumbent, particularly those directors whom the incumbent originally appointed (Fredrickson et al., 1988). Also, CEOs, as a matter of course, work hard to build and maintain the trust of directors and other stakeholders (Kotter, 1982; Lorsch & MacIver, 1989; Miller, 1991; Schleifer & Summers, 1988; Vancil, 1987). These allegiances can influence directors' evaluation of the CEOs. Tight allegiances can reduce directors' compulsion to proactively seek information about the CEOs' performance and make the directors less critical in their interpretation of that information (Fredrickson et al., 1988; Goodstein & Boeker, 1991). Further, tight allegiances may permit an incumbent to manipulate directors' perceptions of what constitutes good performance or what has caused poor performance. Walsh and Seward (1990) suggested that CEOs may try to attribute poor performance to factors outside of their control, such as industry- or marketwide conditions. In sum, when directors hold incumbent CEOs in high regard, the latter are more able to engage in scapegoating subordinates and in distorting information for the purpose of their own benefit (Baysinger & Hoskisson, 1990; Boeker, 1992; Miller, 1991).

It is natural to expect an incumbent to work against the selection of an outsider because outside selection is generally not in the incumbent's best interests. Outsider selection signals that the incumbent's strategies have been disappointing, or that the incumbent has failed to identify and groom a successor, or both (Dyl, 1985; Friedman & Singh, 1989; Lorsch & MacIver, 1989; Mace, 1971). Also, as was mentioned earlier, outsider selection may lead to a discontinuous change in strategy, resulting in an organization that bears little resemblance to that envisioned by the incumbent (Perrow, 1986; Romanelli & Tushman, 1988; Tushman & Romanelli, 1985). This change may include the replacement of the outgoing CEO's executive cadre (Helmich & Brown, 1972; Kotin & Sharif, 1967). Thus, an outsider succession disrupts many implicit contracts established among a firm's executive cadre, including the assumption that one of them would be the successor (Faith et al., 1984). In contrast, an insider is likely to share the values, preferences, and concerns of both the incumbent CEO and other members of the executive cadre, thus making the successor more able to maintain strategies that bear the incumbent's imprint (Faith et al., 1984; Hambrick & Mason, 1984; Helmich & Brown, 1972; Miller, 1991; Smith & White, 1987).

To the extent that outgoing CEOs can influence succession processes, therefore, succession decisions will tend to be predictable, occurring when the incumbents have served implicitly agreed-upon terms commensurate with their ages and their firms' retirement policies (Friedman & Singh, 1989). Vancil (1987) detailed how directors and executives go to great lengths to smooth the transition of power; thus minimizing disruption and sending a

message of stability to outside constituents. Similarly, Hannan and Freeman (1984) argued that of paramount interest to organizational stakeholders are stability and reliability, even though they may strongly promote inertia. In many replacement situations, therefore, the incumbent gradually transfers power to an heir apparent and, after leaving the CEO position, maintains close contact with the firm, either by becoming the chairperson of the board or by retaining a seat on the board.

Recent capital-market event studies examining the shareholder wealth effects associated with succession, the third broad category of succession studies identified by Furtado and Karan (1990), provide indirect support for the sociopolitical assertion that succession events are generally smooth and predictable transitions that imply few changes in strategy. These studies have found that most succession announcements provoke little or no reaction from shareholders (Friedman & Singh, 1989; Lubatkin et al., 1989; Reinganum, 1985; Warner et al., 1988). Put another way, the evidence suggests that most succession events are nonevents to shareholders, who probably anticipate the successions well in advance of their actual occurrence.

This is not to say that continuity is intrinsically bad or good. There may be benefits for both outgoing CEOs and directors in remaining in close contact. For an outgoing CEO, it makes the termination less costly, both psychologically and financially (Miller, 1991; Sonnenfeld, 1988; Vancil, 1987). For directors, it may send the desired signal of stability and control to external constituents (Boeker & Goodstein, 1991; Gilson, 1989; Hannan & Freeman, 1984; Lorsch & MacIver, 1989; Mace, 1971; Mizruchi, 1983). Continuing their contact with outgoing CEOs also permits directors to draw upon the old CEOs' experience and firm-specific knowledge as they grapple with the issue of evaluating the performance of the new CEOs (Fredrickson et al., 1988).

On the other hand, continuity can come at a cost to organizations because it may render succession events relatively inertial. When directors are strongly committed to incumbents, even poorly performing organizations will likely select successors from inside because the directors are unwilling to break the allegiance they feel toward the incumbents and other members of the executive cadres (Dalton & Kesner, 1985; Miller, 1991).

Directors may not, however, always value an incumbent's input in selection decisions. Mizruchi (1983) observed that directors, when confronted with poor performance, may have to either accept the poor performance or forcibly remove the CEO from office. CEO dismissals often represent a strong message from board members that they expected better performance than was achieved and attribute the poor performance to the incumbent CEO (Fredrickson et al., 1988; Puffer & Weintrop, 1991). In dismissal cases, the incumbent is very likely to be excluded from the successor selection decision (Fredrickson et al., 1988; Walsh & Seward, 1990). According to the adaptive view of organizations, when an incumbent is dismissed, directors will base their selection decisions on the performance associated with the

firm's ongoing strategies and be objective in their evaluation of potential successors. Stated formally, the moderating influence of an incumbent CEO's disposition is as follows:

Hypothesis 1: When an incumbent CEO has been dismissed, a firm's poor performance will increase the likelihood of outsider selection. In nondismissal contexts, there will be no relationship between performance and outsider selection.

Heir apparent. The presence of an heir apparent is a second indicator of the sociopolitical construct of director allegiances and values for two reasons. First, the selection of an heir apparent signals stability to stakeholders, for it represents tangible evidence that the "passing of the baton" is under control. It also allows time for various stakeholder groups to gain familiarity with the next likely head of an organization and thus reduces the uncertainties that accompany a leadership change (Kotter, 1982; Vancil, 1987). For a board to not show allegiance to the heir apparent and instead promote someone else to the CEO position would represent the breaking of an implicit contract between the board and the heir apparent. Further, such a move may signal other stakeholders that the directors perceived serious problems on the horizon and thus changed their minds about the heir apparent (Hannan & Freeman, 1984; Lorsch & MacIver, 1989; Staw & Ross, 1987; Vancil, 1987). Finally, passing over an heir apparent may signal stakeholders inside the organization that the directors are untrustworthy (Schleifer & Summers, 1988).

Second, the selection of an heir apparent signals stakeholders that the incumbent CEO is performing one of his or her key responsibilities, the selection and grooming of a successor (Vancil, 1987). This fact also brings credit to the board, for it was the board that originally hired the incumbent and is now charged with overseeing the incumbent's stewardship. Also, because the incumbent CEO often handpicks the heir apparent, it is natural to expect that the incumbent will lobby directors in favor of the heir when the selection decision is being made (Lorsch & MacIver, 1989; Vancil, 1987). Thus, once an heir apparent has been identified, it is unlikely that directors will pass over that person when selecting a new CEO.

Of course, there are some instances, such as the well-publicized events that occurred when Lee Iacocca was the heir apparent at Ford Motor Company, in which an incumbent severs all ties with an heir apparent. Sometimes such an admission of a selection mistake is justified—the heir apparent, when given the chance, did not live up to expectations. At other times, however, the break is motivated more by self-interest. For example, incumbents may feel it not in their best interests to provide directors with too much of an opportunity to observe capable successors, lest the boards decide that the incumbents are expendable (Pfeffer & Moore, 1980).

These counter examples aside, it is more likely to be the case that di-

rectors and an incumbent will display allegiance to an heir apparent. Like incumbent disposition, therefore, the presence of an heir apparent can elicit sociopolitical forces that uncouple the relationship between a firm's performance and the selection decision, thereby promoting inertia. Conversely, the selection decision will tend to be more sensitive to the firm's performance context when there is no heir apparent present. In the latter context, the board will be less bound by inertial allegiances and therefore more free to consider outsider candidates, if the firm's performance context warrants such a search. Thus,

Hypothesis 2: When no heir apparent to an incumbent CEO is present, poor firm performance will increase the likelihood of outsider selection. When an heir apparent is present, there will be no relationship between performance and outsider selection.

Dual-title holders. The number of titles held by an incumbent may be associated with incumbent power, another sociopolitical construct identified by Fredrickson and colleagues (1988). Several authors have suggested that incumbents who also hold the chairperson title have more institutional power than those who hold only the CEO title (Harrison, Torres, & Kukalis, 1988; Lorsch & MacIver, 1989; Morck et al., 1989; Vancil, 1987). As Fredrickson and colleagues pointed out, powerful incumbents may be able to forestall their own removal. Of course, those authors' model dealt with CEO dismissal, although the same logic would seem to apply to CEO selection. At the time of leadership change, powerful incumbents are in a good position to impose their selection wishes on directors. For the various self-serving reasons we discussed earlier, a dual-titled incumbent's successor of choice is likely to come from inside the organization. The idea that the presence of a dual-title holder will uncouple firm performance from the successor selection decision is thus consistent with a sociopolitical view.

Harrison and colleagues (1988), however, advanced a contrary line of reasoning, suggesting a weak form of this prediction. Specifically, although boards may allow dual-title holders wide latitude in decision making (Finkelstein, 1992; Hambrick & Finkelstein, 1987), they may also monitor the dual-title holders' actions very closely. Thus, power and accountability may be separate phenomena. The distinction between the two is best understood within an agency theory framework (Beatty & Zajac, 1990). This theory is chiefly concerned with the design of optimal incentive contracts between principals (stockholders) and their agents (management). The optimal incentive system is one ensuring that agents not shirk their primary responsibilities. A key program, however, is developing a monitoring system that will hold the agents accountable but not be subject to manipulation or bias. Simply put, the more discretion incumbents have, the more accountable they may be held for observed outcomes. Thus, during times of poor firm performance, a dual-title holder may be less able to avoid the blame and therefore be less able to influence the board's selection decision.

The question as to which of the offsetting influences—power or accountability—dominates in explaining outsider selection is an empirical one. Rather than speculate, we followed the power logic because it is much more widely held. Accordingly,

Hypothesis 3: When an incumbent holds only the CEO title, poor firm performance will increase the likelihood of outsider selection. When the incumbent holds both the CEO and the chairperson title, there will be no relationship between performance and outsider selection.

In summary, the three sociopolitical hypotheses suggest that the relationship between organizational performance and the selection of an outsider or insider as a CEO's successor varies with the selection decision's sociopolitical context. Specifically, we suggest that organizational performance will be a strong predictor of outsider selection, but only in certain contexts—when the incumbent is dismissed, when an heir apparent is not present, and when the incumbent is not a dual-title holder. These predictions lead us, however, to the nettlesome problem of defining organizational performance and developing theory regarding how directors may attend to performance factors in successor selection decisions.

METHODS

Data

An exhaustive list of firms in which succession had taken place was identified from *Forbes's* annual June issues on executive compensation. Because these issues list the 800 U.S. firms with the highest-paid chief executives, the population was biased to large, publicly traded firms.¹ Such firms are generally thought of as relatively inertial, as having a large pool of available insider candidates, and as having few large outsider shareholders (Dalton & Kesner, 1983; Reinganum, 1985). As such, they are firms in which the sociopolitical forces discussed earlier may figure prominently (Hannan & Freeman, 1984; Walsh & Seward, 1990).

We identified 1,187 succession events occurring during the period 1971–85 from this list. We then excluded events not announced in the *Wall Street Journal*, those for which we could not obtain daily market returns on Center for Research on Securities Prices (CRSP) tapes, and those in which the formal title of CEO did not pass from one person to another. The first two sampling criteria were necessary to compute the market-based measures of return and risk (discussed below), and the third assured that a CEO succession had occurred. The *Wall Street Journal* criterion was also necessary to

¹ The mean equity market capitalization of these firms in 1980 dollars is \$2.6 billion, with a standard deviation of \$791 million.

help classify the types of executive change. The resulting list consisted of 472 succession events.²

Model

We used a series of logistic regression equations to test the three interactive hypotheses about a binary dependent variable, outsider selection. The logistic models contained 4 measures of performance context, 3 measures of sociopolitical context, 12 interaction terms (each performance measure with each sociopolitical measure), and 2 control variables.

Insider-Outsider Selection

We defined an outsider as any successor with less than two years of service in the firm he or she headed and coded it as a binary (0,1) variable. We identified 52 outsider selections in our data, a number (11%) consistent with those reported in other succession studies.³ We then tested the sensitivity of our results to a more stringent definition of outsider by running tests using the 36 outsider selection cases in which a CEO was hired directly from outside an organization.

Defining and Measuring Organizational Performance

Most succession research has defined the performance context of a succession event as some level of return, be it profitability in business organizations (Dalton & Kesner, 1985; Friedman & Singh, 1989; Warner et al., 1988) or winning percentage in sports teams (Allen, Panian, & Lotz, 1979; Pfeffer & Davis-Blake, 1986). Recently, however, organization researchers have begun to examine another performance-related outcome: risk (Amit & Wernerfelt, 1990; Bettis & Hall, 1982; Lubatkin & Chatterjee, 1991). Risk refers to the level of uncertainty associated with an organization's cash flow. Although much theory has been developed associating level of return with outsider selection, very little has been advanced linking the level of risk to outsider selection. However, inferences about a relationship between risk

² Methodological problems may be associated with the development of binary-state prediction models when the distribution of the two states of interest is skewed toward the non-random selection of succession-only firms. Inconsistent and biased estimates of model parameters and the outsider selection probabilities may occur. We are not predicting succession *per se* however, but rather the likelihood that an outsider will be selected when a succession occurs. Stated differently, our binary-state prediction is not "succession—no succession" but "if succession, outsider or insider?" Also, one of the model's key sociopolitical variables is the disposition of incumbent CEOs, and this measure exists only when a succession occurs.

³ Beatty and Zajac (1987) reported a 12 percent incidence of outsiders, Friedman and Singh (1989) reported 15 percent, and Dalton and Kesner (1985) about 16 percent. None of these authors, however, discussed precisely how outsider was defined. Vancil (1987) defined outside successors as those with less than five years' service to the firm at the time of the succession event. Although we found that definition to be unduly liberal, under it outsiders make up 15 percent of our cases.

and outsider selection can be drawn from some of the arguments concerning return, as low levels of return and high levels of risk can each be interpreted as unsatisfactory outcomes.

Return construct. As previously noted, little evidence has been put forth supporting the idea that return has a direct effect on outsider selection. Both Dalton and Kesner (1985) and Friedman and Singh (1989) reported that low-profit firms are no more likely to select outsider successors than high-profit firms. This lack of support for a direct performance-selection relationship may have been observed because the performance measures used failed to capture the central construct of interest: director expectations and attributions. Simply put, many selection studies try to explain outsider selection with some absolute measure of a firm's returns, rather than one that is calibrated to some benchmark of expected, or normal, performance. The problem is that the absolute measures may lack construct validity in that they do not adequately capture directors' perceptions of good and bad performance (Puffer & Weintrop, 1991).

Morck and colleagues (1989) contrasted the profitability of firms with an industry benchmark and found that succession events were much more likely when a firm's profitability was low relative to the profitability typical of its industry than when the profitability of both the firm and its industry were low. Puffer and Weintrop (1991) found similar succession patterns using a different benchmark, the returns predicted by security analysts.

We measured a return in two ways. First, we calculated an accounting-based measure, return on equity (ROE), as income before extraordinary items and discontinued operations divided by common equity as reported during the fiscal year prior to the year of the succession. We then adjusted each firm's ROE by its industry's average ROE by subtracting the industry's ROE from that of the firm and dividing the result by the standard deviation in industry ROE.⁴ Industry was defined at the two-digit Standard Industrial Code (SIC) level. We refer to this return measure as *adjusted ROE*.

Second, we operationally defined market return using the intercept term of the Capital Asset Pricing Model (CAPM), Jensen's alpha (Jensen, 1968). This estimate of shareholder returns represents a firm's performance relative to that of an unmanaged portfolio of stocks of similar market risk. A nonzero alpha implies that, during the time period in which the alpha was calculated, investors have revised their expectations of the firm's future cash flows (Amit & Wernerfelt, 1990; Lubatkin & Chatterjee, 1991).

We estimated Jensen's alpha over a 100-trading-day window (about four months) ending 50 trading days before a succession event. We regressed

⁴ Industry averages of ratios tend to be highly skewed by a few outliers. We adjusted for this concern by dropping from our industry data observations in which the observed ROE was greater than 100 or less than -100. These outliers represented less than 3 percent of the industry data.

each firm's daily stock returns (appreciation plus dividends) against the daily stock returns of a value-weighted CRSP portfolio intended as a proxy for the return of all risky assets. The 100-day estimation period for Jensen's alpha was used because we wanted to capture firm performance characteristics that directors would be observing around the time of their decisions (Puffer & Weintrop, 1991; Walsh & Seward, 1990) but also wanted to maintain enough distance from the succession events that investor anticipation of the decision would not bias our estimates.

Risk construct. The notion that risk influences selection decisions can be inferred from resource dependence theory. First, a board, by serving as a link to a firm's external environment, is likely to strongly favor stability and predictability (Hannan & Freeman, 1984; Miller, 1991). Second, as Meindl, Ehrlich, and Dukerich (1985) argued, most organization participants assume that CEOs have a substantial influence on performance outcomes, and therefore wide swings in performance are likely to be interpreted as showing a lack of control on the part of an incumbent. Finally, according to Pfeffer and Salancik (1978: 225–256), outsiders are more likely to be selected during times of uncertainty because they are perceived as being better able to produce more certain (less risky) outcomes than insider candidates.

When discussing risk, however, it may be important to differentiate between the variability in returns caused by factors outside the control of management, such as the movement of the market or economy in general, and the variability that is specific to a particular firm and thus, more likely to be associated with the firm's management. The former is referred to as systematic risk, and it includes changes in monetary and fiscal policies, the cost of energy, tax laws, and other marketwide events that affect the returns of all firms. The latter is referred to as unsystematic risk, and it includes effects caused by problems of supply, quality, labor relations, and other firm-specific disturbances (Amit & Wernerfelt, 1990; Bromiley, 1991).

According to finance theory, shareholders are concerned only with systematic risk because by holding diversified portfolios, they can reduce unsystematic risk to zero.⁵ Directors, however, may be less concerned than shareholders with systematic risk when evaluating executive performance,

⁵ The claim that systematic risk is paramount, however, rests on two arguable assumptions from modern portfolio theory: stockholders are fully diversified, and capital markets operate without such imperfections as transaction costs and taxes. Many stockholders, however, are not fully diversified, particularly corporate managers who have heavily invested, both financially and personally, in a single company. Also, transaction costs, such as brokerage fees, may act as a minor impediment, inhibiting other stockholders from completely eliminating unsystematic risk. Finally, since taxes exist, firms are rewarded for improving the total stability of their income streams because they can attract additional debt financing while passing a portion of the cost of capital from their stockholders to the government. Stockholders on their own cannot duplicate such a gain. Thus, stockholders may be concerned with unsystematic risk and consider it along with systematic risk when determining the value of a firm's security (Amit & Wernerfelt, 1990).

because systematic risk is based upon macro economic factors clearly outside of an incumbents' control. Further, incumbents may be able to defend their tenures by reminding the boards of this fact. As Morck and colleagues (1989) and Walsh and Seward (1990) pointed out, executives can often avoid taking the blame for poor performance if they can convince directors that the causes of the poor performance are external to their firms.

There are many reasons, however, why directors may hold a CEO responsible for high levels of unsystematic risk. First, the components of unsystematic risk are manageable but often require an executive's immediate attention. Because these firm-specific factors are unforeseen at the time that they occur, they can also consume a large portion of managerial time, thereby changing the nature of managerial work from proactive to reactive (Mintzberg, 1973). Should an incumbent prove unable to handle these problems, directors may conclude that the CEO is overwhelmed.

Second, the importance of unsystematic risk to directors can be inferred from the work of organization theorists who claim that all stakeholders—shareholders, employees, managers, debt holders, suppliers, and others—have legitimate claims to organizational rewards. To deem the claims of shareholders paramount may inhibit future cooperative efforts, leading to a reduction in the total rewards available. Put differently, a shareholder-only focus may be harmful to organizational efficiency (Freeman, 1984; Mintzberg, 1973). This point is similar to Amit and Wernerfelt's (1990) assertion that unsystematic risk is often linked to operating efficiency.

Third, all directors are concerned with the risk of a firm's defaulting on commitments, since their reputations (Fama & Jensen, 1983), opportunities to secure positions on other boards (Gilson, 1991), and, of course, their investment in the firm, are all adversely affected by default. The risk of default is, however, highly correlated with a firm's level of unsystematic risk (Hayn, 1989). By inference, therefore, directors are concerned about unsystematic risk because they are concerned with default risk, and the two measures capture information from the same underlying concept.

Default risk may be an important issue to directors in more instances than bankruptcy. As Miller and Bromiley (1990) pointed out, the financial pressures that come with high variability in returns can default on explicit commitments, such as contractual arrangements with suppliers or buyers, and implicit commitments, such as promises to employees and customers. These breaches, or the threat of them, may adversely affect a firm's sales and costs because the firm's stakeholders may require incentives to induce them into future transactions.

Finally, directors may be concerned about unsystematic risk because they tend to be managers themselves (Mace, 1971; Mizruchi, 1983), and thus probably share similar viewpoints about risk. Directors, like the managers whom they oversee, generally do not hold diversified portfolios of investments. Instead, they tend to be heavily invested, both financially and personally, in a single company. It follows that directors will be more concerned

with unsystematic risk than the shareholders whom they represent and therefore will likely factor unsystematic risk into their decision criteria when selecting a new CEO.

The above logic suggests that selection decisions are influenced by (among other things) return and unsystematic risk, but not necessarily by systematic risk. This view is consistent with Bettis's (1983: 408) argument that unsystematic risk "lies at the very heart of strategic management." Put another way, just as low returns might lead directors to desire strategic change, so might high firm-specific variability, or uncertainty, in returns. Thus, unless both performance outcome dimensions are jointly considered in a predictive model, the performance-selection relationship may be misspecified.

We selected two market-based measures of risk.⁶ Systematic risk, or market risk, was calculated as the covariance between a firm's return and a value-weighted market portfolio and was estimated by the slope coefficient of the same regression model used to estimate Jensen's alpha. By construction, unsystematic risk was variance in shareholder returns that could not be explained by movements in the market (the residuals) and thus was specific to the firm under consideration (Amit & Wernerfelt, 1990; Brealey & Myers, 1986; Sharpe, 1964). As for Jensen's alpha, return on an unmanaged portfolio of stocks of similar market risk served as the benchmark for both risk measures.

Measures of Sociopolitical Context

Incumbent disposition. We coded incumbent disposition on the basis of the different possible associations a former CEO can have with a firm after succession has occurred. Of course, our first hypothesis predicted that dismissal or its absence would have a moderating effect on insider-outsider selection. However, succession theory suggests that there are at least four nondismissal scenarios (Friedman & Singh, 1989; Morck et al., 1989; Vancil, 1987; Warner et al., 1988). We therefore used a five-level classification

⁶ A common convention in management research is to measure risk as variance in accounting returns (e.g., Bettis & Hall, 1982; Cool & Schendel, 1988; Figenbaum & Thomas, 1988). We chose not to use this measurement for several reasons. First, performance variation does not adequately capture the risk of default, which is likely to be of concern to directors making a selection decision (Fredrickson et al., 1988; Gilson, 1991; Mace, 1971). Second, the performance variation measure is a total risk measure capturing elements of both systematic and unsystematic risk. As such, it may lead to a less precise test, particularly if, as we have argued, the two dimensions of risk do not share similar predictive validity. Third, variance-based measurement requires multiple time periods for derivation, thereby biasing the measure toward historical observation and away from the frame in which directors make selection decisions. Finally, there are hazards associated with using a mean and its corresponding standard deviation as variables in the same empirical model (Ruefli, 1990). Specifically, the results of such an analysis cannot be generalized to any other time periods because the relationship between the mean and the standard deviation may be a function of shifts in the distribution over time.

scheme in subsequent analyses, although we used a binary dismissal-nondismissal measure when testing for a moderating effect.

A relay succession is one in which an heir apparent becomes CEO and the outgoing CEO becomes chairperson (Vancil, 1987). Relay implies a smooth shift in power, minimal disruption to ongoing strategies, and maximum involvement of the incumbent in the selection decision. We categorized 193 successions as relays.

Many firms have rules or traditions that require officers to retire at some age, such as 65 years, but do not extend these restrictions to directors. Therefore, firms that do not use the relay process of succession will often retain outgoing CEOs as directors (Friedman & Singh, 1989; Sonnenfeld, 1988; Warner et al., 1988). We categorized a replacement as a normal retirement ($N = 95$) if an outgoing CEO retained a directorship, did not retain an officership, and was at least 64 years of age (Coughlan & Schmidt, 1985). We categorized a replacement as an early retirement ($N = 52$) if the outgoing CEO met the first two criteria above but was less than 64 years of age. Information in the *Wall Street Journal* announcement of a succession, coupled with age data collected from *Dun & Bradstreet's Reference Book of Corporate Managements*, was used to make these categorizations.

We categorized a succession event as due to the death or poor health of an outgoing CEO if the announcement in the *Wall Street Journal* so indicated. The data included 24 succession events initiated by deaths (5%) and 13 events initiated by poor health (3%). These numbers resemble those reported in previous research: Warner and colleagues (1988) reported 8 percent death- and 2 percent health-related succession events, and Friedman and Singh (1989) reported a total 7 percent of death- and health-related successions.

We categorized a succession event as a dismissal if all officership and directorship connections between a firm and its outgoing CEO were severed at the time of the succession; there were 95 such instances. Clearly, many proactive terminations of incumbent CEOs are difficult to identify using secondary sources, given that public relations representatives are averse to releasing politically sensitive information (Fredrickson et al., 1988; Warner et al., 1988). Also, the reason for the severance of ties can differ; it could be board-initiated firing; pride ("You can't fire me, I quit!"); or an outgoing CEO's voluntarily "jumping a sinking ship" (Friedman & Singh, 1989). To the extent that ambiguities in our classification system existed, however, they promoted a conservative test of the study's hypotheses. As Arnold noted, "Our ability to detect a true moderating effect will always be lower than anticipated when the measure of the independent variable is not perfectly reliable" (1982: 167–168). Additionally, there are at least two reasons why our classification reasonably represents instances in which an outgoing CEO has lost influence with directors. First, CEOs typically do not sever all connections with firms at the time of succession. Of the 472 succession events studied, only 95 (20%) were classified as dismissals. This percentage is generally consistent with that reported in other studies involving dismiss-

als.⁷ Second, as mentioned earlier, relinquishing a CEO position has large financial and psychological consequences (Sonnenfeld, 1988). Vancil (1987) estimated that the dollar cost, in terms of salary, bonus, and retirement compensation, of early departure for a CEO can easily run into the millions of dollars. Nevertheless, we tested the sensitivity of our classification scheme on young (less than 64 years old) and older (over 64) dismissed CEOs to determine if the dismissals of the older group were retirements. Further support for our classification of dismissals came from Friedman and Singh, who reported that, for their sample, "A large proportion of previous CEOs stayed on in corporations in some other capacity following customary retirement; the opposite was true for board-initiated succession" (1989: 738).

Heir apparent. A second categorical measure used to assess sociopolitical context was the presence or absence of an individual in a firm (other than the incumbent CEO) holding the title "president." Though there are clearly exceptions, this title is generally reserved for individuals who are expected to become CEO (Vancil, 1987). We coded an indicator variable, *heir apparent*, as 1 if a person in a firm other than the incumbent CEO was the president and otherwise coded it 0.

In support of this classification scheme, both Vancil (1987), in a detailed clinical study of CEO succession, and Lorsch and MacIver (1989), in a detailed analysis of director decision processes, used the terms *heir apparent* and *president* almost interchangeably. For example, Vancil introduces the chapter "Selecting the Likely Successor" with the following paragraph:

The moment of decision is at hand—and it's probably the most important decision you'll make as CEO. You've thrown the dice for big stakes on several occasions, but the selection of your likely successor is almost like betting the company. You'll still be around for several years, and as Chairman/CEO you can make sure the new President/COO doesn't make any foolish mistakes. But if he doesn't make it, that will be a blot on your record—and the company will have missed an opportunity for you to provide the final grooming of the next CEO (1987: 185).

To provide further support for our measurement, we note that in our data set, the title "COO" was never held by any person who did not also hold the title "president." Further, Vancil's data on CEO succession for 267 large firms between 1960 and 1985 indicate that by far the most common route to the CEO title is through the president position.⁸ We examined the 435 successions in Vancil's data set, with succession defined as the passing of the

⁷ James and Soref (1981) estimated that 14.5 percent of their sample of successions (16 of 110) were dismissals. Warner and colleagues (1988) classified 64 of 230 succession events (28%) as "forced departures." Friedman and Singh (1989) reported that 14 of 130 succession events (11%) were "board initiated." Although the proportion of dismissals we report here may be somewhat high, it enjoys the benefit of being objective and observable.

⁸ We obtained this data set from Richard Vancil, who has offered to make it available to any interested researcher (Vancil, 1987: 283).

CEO title from one person to another. Of the individuals who succeeded to the position, the overwhelming majority (69%) held the president title at the time of the succession. Thus, we believe that the title "president" clearly tends to indicate an heir apparent.⁹

Dual title. The final sociopolitical context measure concerned dual titles. We coded a dummy variable, *dual title*, as 1 if the outgoing CEO at the time of a succession also held the title "chairperson" and as 0 if a person other than the incumbent held that title (Harrison et al., 1988; Morck et al., 1989).

Control Variables

A number of studies have documented that small firms are more likely to select outsider successors than large firms (Dalton & Kesner, 1983; Fredrickson et al., 1988; Warner et al., 1988). Although firm size was not central to our study, we included it in our analysis as a control variable. We measured size as the logarithm of a firm's sales, expressed in 1980 dollars, averaged over the three years prior to a succession.

We used an ordinal variable, *trend*, to represent the sequencing of our 15 years of data (1970–84) on succession events, with the events occurring in 1971 receiving a value of 1 and the events occurring in 1985 receiving a value of 15. Like firm size, *trend* was a control variable intended to capture any temporal changes in selection practices.

RESULTS

Table 1 shows the intercorrelations of the study's measures. The data do not suggest large problems with multicollinearity among the independent variables, but do reveal some expected patterns. For example, firm size appears to be inversely related to risk, with larger firms showing lower levels of unsystematic risk ($r = -.21$, $p < .01$). Also, return and risk, however defined, are not highly correlated, suggesting that each represents a separate performance dimension.

Table 2 presents additional descriptive statistics, organized around the five categories of incumbent disposition, that suggest face validity for our classification scheme. For example, a Scheffé test reveals that the likelihood of outsider selection among the dismissal group (23%) exceeds that for both the relay group (9.8%) and the normal retirement group (2%), a finding fully consistent with the expected pattern. Firm size does not, however, explain the difference in outsider selection patterns: the logarithm of sales associated with the dismissal group is not statistically distinguishable from those of the other disposition groups. As expected, the normal retirement group is, on the average, older than the other groups ($p < .05$), and the dismissal group

⁹ It should be noted that in using the above classification scheme, we are not suggesting that the absence of an heir apparent means that a firm has no available successors. Instead, it simply implies that directors have not publicly identified a particular individual.

TABLE 1
Pearson Correlation Coefficients^a

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9
1. Outsider	0.11	0.31									
2. Trend	8.94	3.80	.04								
3. Size	7.44	1.11	-.05	.00							
4. Adjusted ROE	0.08	0.86	-.16**	.03	-.05						
5. Jensen's alpha	0.00	0.00	-.06	.03	-.10*	.04					
6. Systematic risk	0.95	0.50	.08†	-.12**	.12**	-.01	-.17**				
7. Unsystematic risk	0.02	0.01	.24**	.05	-.21**	.06	.03	.31**			
8. Dismissal	0.20	0.40	.19**	-.03	.03	-.05	-.11*	.08†	.09*		
9. Heir apparent	0.86	0.35	-.21**	.07	.06	.13**	.02	-.09*	-.17**	-.26**	
10. Dual title	0.60	0.49	-.06	-.04	.06	.06	.00	-.02	-.08†	-.10*	.19**

^a N = 472.

† p < .10

* p < .05

** p < .01

TABLE 2
Descriptive Statistics for Sociopolitical Context Measures

Variables	Incumbent Dispositions					Heir Apparent			Dual Title		
	Relay	Early Retirement	Normal Retirement	Death-Poor Health	Dismissal	F	Yes	No	F	Yes	No
Outsider	0.10	0.12	0.02	0.08	0.23	5.87*** ^b	0.08	0.27	20.80***	0.10	0.13
Incumbent's age	61.31	60.92	65.63	62.57	58.96	13.40*** ^c	62.56	56.59	40.59***	62.60	60.53
Size	7.28	7.62	7.71	7.16	7.50	3.55*** ^d	7.46	7.29	1.46	7.50	7.35
Adjusted ROE	0.14	0.08	0.06	-0.01	-0.01	0.59	0.12	-0.21	8.40**	0.12	0.01
Jensen's alpha ^e	0.09	0.04	0.21	0.33	-0.32	1.76	0.06	-0.02	0.23	0.05	0.04
Systematic risk	0.94	0.92	0.89	0.99	1.03	1.15	0.93	1.06	3.83*	0.94	0.97
Unsystematic risk	0.02	0.02	0.01	0.02	0.02	3.79***	0.02	0.02	14.13***	0.02	0.02
Heir apparent	0.88	0.96	0.94	0.88	0.67	9.86*** ^f	0.84	0.37	17.96***	0.91	0.78
Dual title	0.72	0.44	0.54	0.65	0.51	5.86*** ^g	0.02	0.46	35.55***	0.17	0.25
Dismissal											4.86*

^a Because Jensen's alpha tends to be a very small number, statistics reported here represent subgroup means multiplied by 1,000.

^b Scheffé's posttest procedure indicates that the mean for the dismissal group exceeds that of the relay group ($p < .05$) and the normal retirement group ($p < .05$).

^c Scheffé's posttest procedure indicates that the mean age of the normal retirement group exceeds that of the relay group ($p < .05$), the early retirement group ($p < .05$), and the dismissal group ($p < .05$).

^d Scheffé's posttest procedure indicates that the mean for the dismissal group exceeds that of the relay group ($p < .05$).

^e Scheffé's posttest procedure indicates that the mean for the dismissal group exceeds that of the normal retirement group ($p < .05$), and the mean for the relay group exceeds that of the normal retirement group ($p < .05$).

^f Scheffé's posttest procedure indicates that the mean for the dismissal group is less than that of every other group ($p < .05$).

^g Scheffé's posttest procedure indicates that the mean for the relay group is greater than that of the early retirement group ($p < .05$) and that of the dismissal group ($p < .05$).

† $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$

is the youngest. Also as expected, the dismissal group shows higher levels of unsystematic risk than the normal retirement group ($p < .05$). Finally, systematic risk does not differ significantly among the five disposition categories.

Table 2 also presents descriptive statistics organized around the variables for heir apparent and dual title. The analysis of variance (ANOVA) statistics support the face validity of the heir apparent categories, showing the no-heir-apparent category to be associated with lower adjusted ROE and higher levels of risk. Also, dismissals are far more common with the no-heir-apparent category. The likelihood of dismissal is also higher for incumbent CEOs who do not hold the chairperson title. However, no discernible performance patterns emerge for the two dual-title groups.

Table 3 provides the results of a series of logistic regression analyses. Model 1, the base model, contains the four performance-related variables and the two control variables but no sociopolitical variables. Contrary to the findings of Dalton and Kesner (1985), who found no support for the hypothesis that poor organizational performance increases the likelihood of outsider selection, model 1 shows a performance-selection relation that is consistent with theoretical expectations. Specifically, the overall model's chi-square is 35.65, significant at the .001 level, and two performance-related variables, adjusted ROE and unsystematic risk, appear to predict outsider selection. Models 2 and 3, however, suggest that sociopolitical variables may moderate the performance-selection linkage. In model 2, we examined the effects of dismissal and found one of the four possible dismissal-performance interaction terms to be significant ($p < .10$). The overall chi-square of model 2 is 53.00 ($p < .001$). In model 3, we examined the effects of the presence of an heir apparent and found an overall chi-square of 52.14 ($p < .001$). Consistent with Hypothesis 2, two heir apparent-performance interactions are significant. Model 4 adds the effects of dual-title holding. It shows an overall chi-square of 43.11 ($p < .001$) but, contrary to Hypothesis 3, no significant interactions. Finally, model 5 is a fully interactive model, containing all 12 interaction terms associated with the three sociopolitical influences and the four performance-related variables. This model has an overall chi-square of 72.11 ($p < .001$).

Interpreting the true level of significance associated with each interactive term in models 2–4 may be difficult. This difficulty arises because we defined the performance construct broadly with four measures, thus requiring each model to contain at least four interaction terms and raising the likelihood that the models will suffer from multicollinearity. To better clarify each hypothesized interactive effect, as well as to gain additional insight into interpreting the effect, we analyzed the main effect of performance with a series of subgroups based on sociopolitical category.

We began the subgroup analyses with incumbent disposition. The first hypothesis predicts that the relationship between performance and outside selection will be significant in instances of dismissal but insignificant otherwise. Succession theory suggests at least four types of succession that do

TABLE 3
Results of Logistic Regression Analyses for Outsider Selection

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	-3.06**	-2.66*	-2.99†	-1.44	-0.36
Trend	0.04	0.05	0.06	0.04	0.06
Size	-0.13	-0.13	-0.12	-0.12	-0.20
Adjusted ROE	-0.62**	-0.69**	-1.22*	-0.80*	-1.31†
Jensen's alpha	-81.98	-38.38	-562.80	-117.00	-565.59†
Systematic risk	0.18	-0.07	-0.97	-0.24	-1.62*
Unsystematic risk	70.07**	43.77†	136.30**	34.07	40.26
Dismissal		-1.30			-1.80
Heir apparent			-0.43		-0.72
Dual title				-2.39**	-2.21*
Dismissal × ROE		0.06			-0.21
Dismissal × Jensen's alpha		49.62			70.53
Dismissal × systematic risk		0.86			0.81
Dismissal × unsystematic risk		75.18†			99.61*
Heir apparent × ROE			0.79		0.54
Heir apparent × Jensen's alpha			509.00†		468.26
Heir apparent × systematic risk			1.49*		2.04*
Heir apparent × unsystematic risk			-90.21		-88.49
Dual title × ROE				0.31	0.38
Dual title × Jensen's alpha				87.28	137.93
Dual title × systematic risk				0.94	0.23
Dual title × unsystematic risk				59.20	99.67†
-2 logarithmic likelihood	291.75	274.43	275.31	284.34	255.34
Chi-square	35.65***	53.00***	52.14***	43.11***	72.11***
df	6	11	11	11	21
Pseudo R ²	.070	.101	.099	.084	.133

† $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$

TABLE 4
Results of Logistic Regression Analyses for Incumbent
Disposition Subgroups

Variables	Relay	Early Retirement	Normal Retirement*	Death-Poor Health	Dismissal
Number of observations	193	52	95	37	95
Number of outsiders	19	6	2	3	22
Intercept	0.05	1.93		0.08	-7.41**
Trend	-0.04	0.20		-0.14	0.13†
Size	-0.33	-0.60		-0.57	0.18
Adjusted ROE	-0.71*	-0.74		-0.47	-0.61*
Jensen's alpha	9.72	-642.26†		144.98	14.69
Systematic risk	-0.08	0.59		0.20	0.79
Unsystematic risk	26.62	-159.86		93.82	133.82***
-2 logarithmic likelihood	115.74	29.64		14.30	76.81
Chi-square	8.42	7.56		6.52	26.02***
df	6	6		6	6
Pseudo R ²	.042	.127		.150	.542

* Because the normal retirement subgroup included only two occurrences of outsider selection, the maximization algorithm for the "logit" regression failed to converge. For this reason, no coefficient estimates are reported for this group.

† $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$

not involve dismissal (Friedman & Singh, 1989; Morck et al., 1989; Vancil, 1987; Warner et al., 1988). Rather than assume homogeneity across these four types, we tested Hypothesis 1 with a series of logistic regression equations, one for each replacement context; Table 4 presents the results. As Hypothesis 1 predicts, the relationship between performance and outsider selection is significant ($p < .001$) when an incumbent CEO has been dismissed, but that relationship is not present for the nondismissal subgroups. It is also interesting to note that the normal retirement subgroup ($N = 95$) contained only two instances of outsider selection. Also consistent with expectations, both return and risk are important predictors of outside selection in instances of dismissal. Specifically, as a firm's ROE declines relative to that of its core industry, the likelihood of outsider selection increases ($p < .05$). Also, as the firm's level of unsystematic risk increases, so does the likelihood of outsider selection ($p < .001$).¹⁰

¹⁰ We tested the sensitivity of our results to the definition of dismissal by splitting the dismissal subgroup into young (age < 64) and older (age ≥ 64) categories following Coughlan and Schmidt's (1985) age criterion. We did this because the dismissals in the older category may have been retirements. Results of the logistic analysis were consistent for the two age-dismissal categories, with unsystematic risk a significant determinant of outsider selection for both. This evidence suggests that our classification of dismissals is reasonably reliable, and therefore all analyses presented in the tables were done on a subgroup that pooled all dismissal observations.

TABLE 5
Results of Logistic Regression Analyses for Heir-Apparent Subgroups

Variables	Heir Apparent	No Heir Apparent
Number of observations	405	67
Number of outsiders	34	18
Intercept	-3.27*	-3.45
Trend	0.07	0.02
Size	-0.15	-0.00
Adjusted ROE	-0.44†	-1.56*
Jensen's alpha	-54.60	-559.07*
Systematic risk	0.54	-1.05†
Unsystematic risk	44.19†	139.31**
-2 logarithmic likelihood	217.92	57.02
Chi-square	15.61*	20.96***
df	6	6
Pseudo R ²	.037	.238

† $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$

Table 5 presents the two heir-apparent subgroup logistic regressions. Consistent with Hypothesis 2, the relationship between performance and outsider selection for the subgroup of firms in which there was an heir apparent is weak. Although the overall model is significant ($p < .05$), the strength of the association as estimated by the pseudo R^2 is only .037. Further, although both ROE and unsystematic risk are related to outsider selection, the relationship is marginal ($p < .10$). In contrast, the no-heir-apparent subgroup shows a much stronger relationship between performance context and outsider selection (pseudo $R^2 = .238$) and a more highly significant relationship ($p < .001$), despite having only 17 percent as many observations as the heir-apparent subgroup. Also, both returns measures, adjusted ROE and Jensen's alpha, are associated with outsider selection ($p < .05$) in the expected direction: as returns decrease, the likelihood of outsider selection increases. Finally, unsystematic risk is also associated with outsider selection ($p < .01$) in the expected direction. In summary, the presence of an heir apparent tends to uncouple the relationship between performance and outsider selection, although not as strongly as occurs in the nondismissal subgroups.¹¹

Table 6 presents results for the two dual-title-holder subgroup logistic regression analyses. Contrary to Hypothesis 3, whether or not an incumbent CEO holds the chairperson title does not appear to moderate the relationship

¹¹ The results for the heir-apparent subgroup were noted even though 16 of the heir apparents in the subgroup of 405 were themselves outsider successors according to our definition. When we removed this potential bias by defining an outsider more stringently—CEO hired directly from the outside—the results were unchanged. This analysis is available from the first author upon request.

TABLE 6
Results of Logistic Regression Analyses for Dual-Title Subgroups

Variables	Incumbent Holds CEO and Chairperson Titles	Incumbent Holds Only CEO Title
Number of observations	285	187
Number of outsiders	27	25
Intercept	-3.45†	-1.74
Trend	0.01	0.06
Size	-0.19	-0.18
Adjusted ROE	-0.49†	-0.81**
Jensen's alpha	-26.45	-116.02
Systematic risk	0.65	-0.24
Unsystematic risk	94.94***	35.54
-2 logarithmic likelihood	149.20	134.71
Chi-square	29.42***	12.40†
df	6	6
Pseudo R ²	.068	.062

† $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$

between performance and outsider selection. Given that the percentage of outsiders in each subgroup is approximately the same and that their respective pseudo R^2 s are also about the same, the difference in the magnitude and significance of the two models' chi-square statistics may be driven by subgroup size differences.

Finally, we investigated investor responses to outsider selection across our sociopolitical categories using a cumulative prediction error measure that was described by Lubatkin and colleagues (1989). Consistent with much prior research (Friedman & Singh, 1991; Lubatkin et al., 1989; Reinganum, 1985; Warner et al., 1988), our finding was that there was little investor reaction to outsider selection. The one exception was in the relay category, where investors reacted significantly more positively to outsider selection than to insider selection ($p < .05$). Although this finding could mean that outsider selections are value-creating in the relay context, it could also mean that investors are merely more surprised by an outsider selection in that context, given the inertial character of a relay succession. Also, the lack of a significant investor reaction to outsider selection for the dismissal category might be due to investor anticipation of director action. In summary, the cumulative prediction error analysis is interesting, but difficult to interpret.¹²

¹² This analysis is available from the first author upon request.

DISCUSSION AND CONCLUSIONS

Most research about executive selection has modeled selection decisions as a function of organizational performance, although as Furtado and Karan (1990) noted, no study had yet provided strong statistical support for this model. We offer three explanations as to why our study found a performance-selection association.

First, this study was based on the premise that the link between performance and selection decisions is not direct but rather is moderated by the sociopolitical context in which a decision is made. As such, our model draws heavily from Fredrickson and colleagues' (1988) sociopolitical model of CEO dismissal but extends it to the domain of CEO selection. In our conceptualization, sociopolitical forces limit the extent to which directors react appropriately to poor outcomes. As such, sociopolitical forces tend to make succession events relatively unadaptive, or inertial. Only when sociopolitical forces are relatively weak is performance linked to selection decisions.

Second, following the recommendations of Boeker and Goodstein (1991), Fredrickson and colleagues (1988), Morck and colleagues (1989), and Puffer and Weintrop (1991), we used measures of performance outcomes calibrated to a benchmark of expected, or normal, performance. By using relative measures rather than the more commonly used absolute measures, we may have better captured directors' expectations and attributions concerning current performance. However, our results also suggest that sociopolitical forces, such as the presence of an heir apparent or a CEO who retains a postsuccession connection to a firm, can mitigate the attributions directors make from observed outcomes.

Finally, following Amit and Wernerfelt (1990), Lubatkin and Chatterjee (1991), and others who have addressed corporate diversification, we examined two critical organizational performance outcomes, return and risk, and thus departed from the one-dimensional examination that has been the convention in the succession literature. Our theory development suggested that directors consider both outcomes when evaluating the performance of incumbent CEOs, and our results supported this expectation. For example, we observed high levels of unsystematic risk to be associated with outsider selection in instances in which an incumbent had little sociopolitical power.

Our results suggest the possible inaccuracy of arguing that the selection process is either an adaptive, economically rational, mechanism or an inertial, nonadaptive mechanism because we found evidence to support both views. Executive selection in the context of incumbent dismissal appears to follow adaptive expectations in that the directors of the firms studied seemed willing to disrupt the status quo on the basis of the firms' performance. Further, when no heir apparent was present, directors appeared more willing to engage in a search for successors that included candidates external to a firm. Finally, these results held regardless of the size of the firms studied. In other words, large firms are not necessarily resistant to change.

However, poor performance by itself is not sufficient to trigger an adaptive response as drastic as outsider selection. As our results show, the likelihood of an outsider selection appears not to vary with a firm's performance characteristics outside the dismissal context and when an heir apparent is present. The research implications that come from the subgroup analysis are clear: it may not be meaningful to investigate the association of performance and outsider selection without explicitly considering sociopolitical forces.

Interestingly, our results for CEO duality did not conform to our conceptualization of sociopolitical forces. Perhaps, as Harrison and colleagues (1988) pointed out, the power of the CEO position is higher when the CEO also holds the title of chairperson, but the accountability of the joint position holder is also higher. That is, directors will monitor the performance of a dual-title holder more closely as a check on the individual's greater institutional power. Thus, outsider selection when a CEO is also chairperson could be initiated in two ways. The incumbent, aware of directors' close monitoring, may take the lead in encouraging consideration of outsider candidates (Lorsch & MacIver, 1989). Alternatively, directors, aware of the incumbent's influence, may move to isolate the incumbent from the selection process. Disentangling these alternate causal mechanisms is an important topic for future research.

Our results regarding the importance of unsystematic risk may be interpreted as inconsistent with capital asset pricing theory. However, our results are consistent with those of a growing number of strategic management scholars who have argued the importance of unsystematic risk to strategic management (Amit & Wernerfelt, 1990; Bettis, 1983). Also, our results are consistent with the belief that uncertainty reduction is a very important motive for the actions of organizational participants (Cameron, Kim, & Whetton, 1987; Hannan & Freeman, 1984; Pfeffer & Salancik, 1978; Weick, 1979). Many organizational stakeholders, like employees and suppliers, are threatened by high levels of unsystematic risk. Also, directors may be concerned about high levels of unsystematic risk because it threatens debt holders, thereby raising default risk and the marginal cost of capital. Finally, directors are concerned about high firm instability because it threatens their reputations (Fama & Jensen, 1983; Gilson, 1991). In other words, it is not surprising that directors consider unsystematic risk when initiating a selection decision, at least when an incumbent CEO has little sociopolitical power.

Our results about the unimportance of systematic risk are also controversial but are nevertheless consistent with the view that systematic risk factors are outside the control of management or, in Bettis's terms, not "at the heart of strategic management" (1983: 408). Whether or not this view is true (see Lubatkin and Chatterjee [1991] for theoretical arguments and empirical evidence to the contrary), the point is that if CEOs can convince directors that high levels of systematic risk—and, therefore, expensive equity—are caused by factors outside of their control, the directors will not perceive a need for a leadership change. This attribution argument is consistent with

ideas discussed by Morck and colleagues (1990) and Walsh and Seward (1990).

Finally, our results exhibited clear differences with Dalton and Kesner's (1985) observation that outside successions occur only in organizations characterized by midrange performance and not in those performing poorly. Their explanation for this controversial finding was that outsiders may be unwilling to accept the career risk that goes with accepting the helm of a poorly performing firm. Our results, however, suggest otherwise. For our data, low profitability was a good predictor of outside selection, particularly when sociopolitical forces were weak. Indeed, when we divide our 472 selection events into deciles based on return on equity, as did Dalton and Kesner, we find outside selections to occur across all ten deciles, with a large percentage (37%) in the two deciles with the lowest returns. Our results therefore suggest that many executives may be willing to incur high career risks in pursuit of the high career payoffs generally associated with masterminding a successful turnaround.

In conclusion, this study used a sociopolitical framework and a more fully specified definition of organizational performance than has typified previous research to shed light on the puzzling results found by others who have investigated the association between performance and executive selection.

REFERENCES

- Allen, P. A., Panian, S. K., and Lotz, R. E. 1979. Managerial succession and organizational performance: A recalcitrant problem revisited. *Administrative Science Quarterly*, 24: 167-180.
- Amit, R., & Wernerfelt, B. 1990. Why do firms reduce business risk? *Academy of Management Journal*, 33: 520-533.
- Arnold, H. J. 1982. Moderator variables: A clarification of conceptual, analytic and psychometric issues. *Organizational Behavior and Human Performance*, 29: 143-174.
- Baysinger, B., & Hoskisson, R. E. 1990. The composition of boards of directors and strategic control: Effects on corporate strategy. *Academy of Management Review*, 15: 72-87.
- Beatty, R. P., & Zajac, E. J. 1987. CEO change and firm performance in large corporations: Succession effects and manager effects. *Strategic Management Journal*, 8: 305-317.
- Beatty, R. P., & Zajac, E. J. 1990. Top management incentives, monitoring, and risk-bearing: A study of executive compensation, ownership, and board structure in initial public offerings. *Academy of Management Best Paper Proceedings*: 7-11.
- Bettis, R. A. 1983. Modern financial theory, corporate strategy, and public policy: Three conundrums. *Academy of Management Review*, 8: 406-415.
- Bettis, R. A., & Hall, W. K. 1982. Diversification strategy, accounting determined risk, and accounting determined return. *Academy of Management Journal*, 45: 254-264.
- Bibeault, D. B. 1982. *Corporate turnaround*. New York: McGraw-Hill.
- Boeker, W. 1992. Power and managerial dismissal: Scapegoating at the top. *Administrative Science Quarterly*, 37: 400-421.
- Boeker, W., & Goodstein, J. 1991. Organizational performance and adaptation: Effects of envi-

- ronment and performance on changes in board composition. *Academy of Management Journal*, 34: 805–826.
- Brealey, R., & Myers, S. 1986. *Principles of corporate finance*. New York: McGraw-Hill.
- Bromiley, P. 1991. Testing a causal model of corporate risk taking and performance. *Academy of Management Journal*, 34: 37–59.
- Cameron, K. S., Kim, M. U., & Whetten, D. A., 1987. Organizational effects of decline and turbulence. *Administrative Science Quarterly*, 32: 222–240.
- Carroll, G. R. 1984. Dynamics of publisher succession in newspaper organizations. *Administrative Science Quarterly*, 29: 93–113.
- Child, J. 1972. Organizational structure, environment, and performance: The role of strategic choice. *Sociology*, 6: 1–22.
- Cool, K., & Schendel, D. 1988. Performance differences among strategic groups. *Strategic Management Journal*, 9: 207–223.
- Coughlan, A. T., & Schmidt, R. M. 1985. Executive compensation, management turnover, and firm performance. *Journal of Accounting and Economics*, 7: 43–66.
- Dalton, D. R., & Kesner, I. F. 1983. Inside/outside succession and organizational size: The pragmatics of executive replacement. *Academy of Management Journal*, 26: 736–742.
- Dalton, D. R., & Kesner, I. F. 1985. Organizational performance as an antecedent of inside/outside chief executive succession: An empirical assessment. *Academy of Management Journal*, 28: 749–762.
- Dyl, E. A. 1985. Reinganum on management succession. *Administrative Science Quarterly*, 30: 373–374.
- Faith, R. L., Higgins, R. S., & Tollison, R. D. 1984. Managerial rents and outside recruitment in the Coasian firm. *American Economic Review*, 74: 660–672.
- Fama, E. F., & Jensen, M. C. 1983. Separation of ownership and control. *Journal of Law and Economics*, 26: 301–325.
- Figenbaum, A., & Thomas, H. 1988. Attitudes toward risk and the risk-return paradox: Prospect theory explanations. *Academy of Management Journal*, 31: 85–106.
- Finkelstein, S. 1992. Power in top management teams: Dimensions, measurement, and validation. *Academy of Management Journal*, 35: 505–538.
- Fredrickson, J. W., Hambrick, D. C., & Baumrin, S. 1988. A model of CEO dismissal. *Academy of Management Review*, 13: 255–270.
- Freeman, E. R. 1984. *Strategic management: A stakeholder approach*. Marshfield, MA: Pitman.
- Friedman, S. D., & Singh, H. 1989. CEO succession events and stockholder reaction: The influence of context and event context. *Academy of Management Journal*, 32: 718–744.
- Furtado, E. P. H., & Karan, V. 1990. Causes, consequences, and shareholder wealth effects of management turnover: A review of the empirical evidence. *Financial Management*, 19(2): 60–75.
- Gamson, W. A., & Scotch, N. A. 1964. Scapegoating in baseball. *American Journal of Sociology*, 70: 69–72.
- Gilson, S. C. 1989. Management turnover and financial distress. *Journal of Financial Economics*, 25: 241–262.
- Gilson, S. C. 1991. Bankruptcy, banks, boards, and blockholders. *Journal of Financial Economics*, 27: 355–387.

- Goodstein, J., & Boeker, W. 1991. Turbulence at the top: A new perspective on governance structure changes and strategic change. *Academy of Management Journal*, 34: 306–330.
- Grusky, O. 1961. Corporate size, bureaucratization, and managerial succession. *American Journal of Sociology*, 67: 261–269.
- Grusky, O. 1963. Managerial succession and organizational effectiveness. *American Journal of Sociology*, 69: 21–31.
- Hambrick, D. C., & Finkelstein, S. 1987. Managerial discretion: A bridge between polar views on organizations. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior*, vol. 9: 369–406. Greenwich, CT: JAI Press.
- Hambrick, D. C., & Mason, P. A. 1984. Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review*, 9: 193–206.
- Hannan, M. T., & Freeman, J. 1984. Structural inertia and organizational change. *Administrative Science Quarterly*, 49: 149–164.
- Hannan, M. T., & Freeman, J. 1988. *Organizational ecology*. Cambridge, MA: Harvard University Press.
- Harrison, J. R., Torres, D. L., & Kukalis, S. 1988. The changing of the guard: Turnover and structural change in the top-management positions. *Administrative Science Quarterly*, 33: 211–232.
- Hayn, C. 1989. Tax attributes as determinants of shareholder gains in corporate acquisitions. *Journal of Financial Economics*, 23: 121–153.
- Helmich, D. L., & Brown, W. B. 1972. Successor type and organizational change in the corporate enterprise. *Administrative Science Quarterly*, 17: 371–381.
- Hofer, C. W. 1980. Turnaround strategies: An examination. *Journal of Business Strategy*, 1: 19–31.
- James, D. R., & Soref, M. 1981. Profit constraints on managerial autonomy: Managerial theory and the unmaking of the corporate president. *American Sociological Review*, 46: 1–18.
- Jensen, M. C. 1968. The performance of mutual funds in the period 1945–1964. *Journal of Finance*, 23:389–419
- Jensen, M. C. 1986. Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review*, 76: 323–329.
- Kotter, J. P. 1982. *The general managers*. New York: Free Press.
- Kotin, J., & Sharif, M. 1967. Managerial succession and administrative style. *Psychiatry*, 30: 237–248.
- Lieberson, S., & O'Connor, J. F. 1972. Leadership and organizational performance: A study of large corporations. *American Sociological Review*, 37: 117–130.
- Lorsch, J. W., & MacIver, E. 1989. *Pawns or potentates: The reality of America's corporate boards*. Boston: Harvard Business School Press.
- Lubatkin, M., & Chatterjee, S. 1991. The strategy-shareholder value relationship: Testing temporal stability across market cycles. *Strategic Management Journal*, 12: 251–270.
- Lubatkin, M., Chung, K., Rogers, R. C., & Owers, J. 1989. Stockholder reactions to CEO changes in large corporations. *Academy of Management Journal*, 32: 47–68.
- Mace, M. L. 1971. *Directors: Myth and reality*. Cambridge, MA: Harvard Business School Division of Research.
- McEachern, W. A. 1975. *Managerial control and performance*. Lexington, MA: Lexington Books.

- Meindl, J. R., Ehrlich, S. B., & Dukerich, J. M. 1985. The romance of leadership. *Administrative Science Quarterly*, 17: 371-381.
- Miller, D. 1991. Stale in the saddle: CEO tenure and the match between organization and environment. *Management Science*, 37: 34-52.
- Miller, K., & Bromiley, P. 1990. Strategic risk and corporate performance: An analysis of alternative risk measures. *Academy of Management Journal*, 33: 756-779.
- Mintzberg, H. 1973. *The nature of managerial work*. New York: Harper & Row.
- Mizruchi, M. S. 1983. Who controls whom? An examination of the relationship between management and boards of directors in large American corporations. *Academy of Management Review*, 8: 426-435.
- Morck, R., Schleifer, A., & Vishny, R. W. 1989. Alternative mechanisms for corporate control. *American Economic Review*, 79: 842-852.
- Perrow, C. 1986. *Complex organizations: A critical essay*. New York: Random House.
- Pfeffer, J., & Davis-Blake, A. 1986. Administrative succession and organizational performance: How administrative experience moderates the succession effect. *Academy of Management Journal*, 29: 76-83.
- Pfeffer, J., & Moore, W. L. 1980. Power in university budgeting: A replication and extension. *Administrative Science Quarterly*, 21: 398-418.
- Pfeffer, J., & Salancik, G. 1978. *The external control of organizations: A resource dependence perspective*. New York: Harper & Row.
- Puffer, S. M., & Weintrop, J. B. 1991. Corporate performance and CEO turnover: The role of performance expectations. *Administrative Science Quarterly*, 36: 1-19.
- Reinganum, M. R. 1985. The effects of executive succession on shareholder wealth. *Administrative Science Quarterly*, 30: 46-60.
- Romanelli, E., & Tushman, M. L. 1988. Executive leadership and organizational outcomes: An evolutionary perspective. In D. C. Hambrick (Ed.), *The executive effect: Concepts and methods for studying top managers*: 129-146. Greenwich, CT: JAI Press.
- Ruefli, T. W. 1990. Mean-variance approaches to risk-return relationships in strategy: Paradox lost. *Management Science*, 36: 368-380.
- Schleifer, A., & Summers, L. H. 1988. Breach of trust in hostile takeovers. In A. Auerbach (Ed.), *Corporate takeovers*: 33-56. Chicago: University of Chicago Press.
- Schwartz, K. B., & Menon, K. 1985. Executive succession in failing firms. *Academy of Management Journal*, 28: 680-686.
- Sharpe, W. F. 1964. Capital asset prices: A theory of market equilibrium under conditions of risk. *Journal of Finance*, 19: 425-442.
- Smith, J., Carson, K., & Alexander, R. 1984. Leadership: It can make a difference. *Academy of Management Journal*, 29: 562-595.
- Smith, M., & White, M. K. 1987. Strategy, CEO specialization, and succession. *Administrative Science Quarterly*, 32: 263-280.
- Sonnenfeld, J. 1988. *The hero's farewell: What happens when CEOs retire*. New York: Oxford University Press.
- Starbuck, W. H., Greve, A., & Hedberg, B. L. T. 1978. Responding to crisis. *Journal of Business Administration*, 9: 111-137.
- Staw, B. M., & Ross, J. 1987. Behavior in escalation situations: Antecedents, prototypes, and solutions. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, vol. 9: 39-78. Greenwich, CT: JAI Press.

- Tushman, M. L., & Romanelli, E. 1985. Organizational evolution: A metamorphosis model of convergence and reorientation. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, vol. 7: 171-222, Greenwich, CT: JAI Press.
- Vancil, R. F. 1987. *Passing the baton: Managing the process of CEO succession*. Boston: Harvard Business School Press.
- Virany, B., Tushman, M., & Romanelli, E. 1992. Executive succession and organization outcomes in turbulent environments: An organizational learning approach. *Organization Science*, 3: 72-91.
- Walsh, J. P., & Seward, J. K. 1990. On the efficiency of internal and external corporate control mechanisms. *Academy of Management Review*, 15: 421-458.
- Warner, J. B., Watts, R. L., & Wruck, K. H. 1988. Stock prices and top management changes. *Journal of Financial Economics*, 20: 461-492.
- Weick, K. E. 1979. *The social psychology of organizing*. New York: Random House.
- Zald, M. N. 1965. Who shall rule? A political analysis of succession in a large welfare organization. *Pacific Sociological Review*, 8: 52-60.

Albert A. Cannella, Jr., is an assistant professor of strategic management at Texas A&M University. He received his Ph.D. degree in strategic management from Columbia University in 1991. His research interests are centered on executives, including executive succession and how executives influence organizational outcomes.

Michael Lubatkin is a professor of strategy and management at the University of Connecticut and Groupe ESC Lyon (France). He received his Ph.D. degree from the University of Tennessee in 1982. His research interests include top management succession, corporate diversification theory, mergers and acquisitions, organizational and national culture, administrative heritage, and strategic decision processes.

STRATEGIC ALLIANCE STRUCTURING: A GAME THEORETIC AND TRANSACTION COST EXAMINATION OF INTERFIRM COOPERATION

ARVIND PARKHE
Indiana University

Maintaining robust cooperation in interfirm strategic alliances poses special problems. Such relationships have received growing attention in recent research grounded in game theory, which has suggested that some alliance structures are inherently more likely than others to be associated with high opportunity to cheat, high behavioral uncertainty, and poor stability, longevity, and performance. The present study merged these theoretical insights with the logic of transaction cost economics in a general model of alliance structuring and tested it with data from 111 interfirm alliances. Findings generally supported the model and hypotheses, suggesting the need for a greater focus on game theoretic structural dimensions and institutional responses to perceived opportunism in the study of voluntary interfirm cooperation.

Strategic alliances are voluntary interfirm cooperative agreements, often characterized by inherent instability arising from uncertainty regarding a partner's future behavior and the absence of a higher authority to ensure compliance. This self-governance (Telser, 1980) feature greatly complicates such relationships, since mutual cooperation, although desirable, is not automatic; the self-interest orientation of each party (Williamson, 1985) can lead to actions that are individually rational yet produce a collectively sub-optimal outcome. In the wake of reports that (1) more alliances have been announced since 1981 than in all prior years combined (Anderson, 1990), (2) this dramatic acceleration in the rate of formation of such alliances (Hergert & Morris, 1988) as well as their strategic significance to their parent firms' current and anticipated core businesses, markets, and technologies is likely to continue (Harrigan, 1987), and (3) such alliances are frequently accompanied by problems of instability, poor performance, and collapse, with estimates of mortality rates ranging up to 70 percent (*Business Week*, 1986; Geringer & Hebert, 1991; Porter & Fuller, 1986), the issue of structuring

I am grateful to the anonymous reviewers for this journal and to Rajan Chandran, Farok Contractor, Jose de la Torre, George Dreher, Donald Lessard, Janet Near, Phillip Podsakoff, Sankaran Raghunathan, Edward Rosenthal, Sanat Sarkar, and Charles Schwenk for their helpful suggestions. Data collection was partially funded by a research grant and university fellowship from Temple University.

alliances to promote robust cooperation has become highly relevant for both academics and practitioners.

A growing body of theoretical research (Borys & Jemison, 1989; Oliver, 1990; Powell, 1990; Ring & Van de Ven, 1992) and empirical studies (Heide & Miner, 1992; Osborn & Baughn, 1990; Parkhe, 1993b; Seabright, Levinthal, & Fichman, 1992) is addressing interfirm cooperation, including work that diagnoses the critical importance of alliance structure in promoting stable cooperation. However, extant research typically stops short of identifying specific structural dimensions or specifying how those dimensions may be tied to alliance performance. In this article, I propose that recent work rooted in game theory (Axelrod & Keohane, 1986; Oye, 1986) may provide the needed conceptual extension in alliance structuring. This work identifies three specific structural dimensions and posits that some structures provide better incentives for effective cooperation than others. Empirical support for this thesis would have provocative positive and normative implications, since it would suggest that later problems can be mitigated by doing things differently at the "front end"—that *ex ante* attention to structure can improve cooperative performance.

In light of the sparse research base on the formation, maintenance, and dissolution of interfirm alliances, I developed a model linking game theoretic structure and transaction cost economics and empirically tested it. This study is thus an attempt to make several contributions to the cooperative strategy literature. First, the integrative model eclectically combines and extends insights from game theory and the transaction cost paradigm, each reinforcing the other to provide a richer account of alliance structuring. Second, I explored critical related variables that come into play as each firm in an alliance attempts to capture the benefits of cooperation without a concomitant increase in its vulnerability (Gupta & Singh, 1990) to opportunism. Such *ex ante* and *ex post* attempts to deter opportunism in turn reshape alliance structure and performance. Finally, this article should add to the emerging literature on interfirm cooperation by building on and extending prior research on opportunism (Hennart, 1991; John, 1984; Provan & Skinner, 1989; Williamson, 1983), behavioral transparency (Axelrod, 1984; Bendor, Kramer, & Stout, 1991; Spence, 1978), and trust (Bromiley & Cummings, 1991; Thorelli, 1986).

A PREFATORY NOTE ON TERMINOLOGY

It is important at the outset to define the terms and to circumscribe the theoretical domain investigated in this study. Distinct from alternate modes of organizational structure, strategic alliances are the "relatively enduring interfirm cooperative arrangements, involving flows and linkages that utilize resources and/or governance structures from autonomous organizations, for the joint accomplishment of individual goals linked to the corporate mission of each sponsoring firm" (Parkhe, 1991: 581). Although surmounting many of the problems associated with other institutional arrangements, strategic

alliances nonetheless present their own unique set of challenges (Hergert & Morris, 1988); one of these, alliance structuring, is the ambit of the present article.

Companies enter interfirm alliances for a wide variety of strategic motives, using diverse organizational forms and legal structures. However, important substratal commonalities of incentives and motivations underpin various types of alliances, because at the heart of the broad phenomenon of voluntary interfirm cooperation (the forest) lie generic structural factors shared by most individual alliance types (the trees). Alliances fundamentally possess the shared feature of ongoing mutual interdependence, a condition in which one party is vulnerable to another whose behavior is not under the control of the first. The overarching theme that unites alliances is that "each needs the others to advance their individual interests" (Gray, 1989: 6), yet these needs intersect with behavioral uncertainty to create vulnerability to opportunism. This vulnerability predictably actuates *ex ante* and *ex post* countervailing measures erected as bulwarks against potential opportunism. Although the particulars of these measures may be agreement-specific, the underpinning theoretical concepts addressed in this article transcend alliance types, and the relationships among these concepts are strikingly similar across alliances (Williamson, 1985).

Consequently, although acknowledging the relevance and usefulness of studying individual alliance types in depth (e.g., Geringer & Hebert, 1991), I focused on the global problem of developing robust cooperative relationships. Literatures in many research traditions have grappled with this problem, yet they all share a common theoretical core that touches what Ouchi called the "fundamental problem of cooperation" (1980: 130). The model and hypotheses developed in the next section reflect a consolidation and refinement of two of these literatures. I incorporated key variables from transaction cost economics into the basic alliance structure-performance relationship posited by game theory in order to better understand and predict effective performance.

THEORETICAL GROUNDING AND HYPOTHESES DEVELOPMENT

Game Theory

The incentive to cheat in cooperative ventures occurs because each partner finds it "advantageous to maximize his own gains at the expense of the venture" (Hennart, 1991: 486), and indeed, all parties involved have an "inalienable *de facto* right to pursue their own interests at the expense of others" (Buckley & Casson, 1988: 34). This incentive creates high instability (Kogut, 1989; Parkhe, 1993b) and a situation isomorphous to the game of prisoner's dilemma. It is fruitful to briefly examine the structure of the prisoner's dilemma.

In this game, two players are suspected of a hypothetical major crime, such as murder. They are imprisoned and held incommunicado, so each must decide whether to cooperate or to defect, without knowing what the

other will do. The authorities possess evidence to secure conviction on only a minor charge, such as illegal possession of weapons. If neither prisoner squeals, both will draw a light sentence on the minor charge; this state is called a mutual cooperation (MC) payoff. If one prisoner squeals and the other stonewalls, the squealer will go free (unilateral defection, UD), and the stonewaller, or "sucker," will draw a very heavy sentence (unilateral cooperation, UC). If both squeal, both will draw a moderate sentence (mutual defection, MD).

Each prisoner's preference ordering is $UD > MC > MD > UC$. Each prisoner will be better off squealing than stonewalling, no matter what his partner chooses to do, because $UD > MC$ (the temptation of cheating) and $MD > UC$ (the fear of being cheated upon). But if both defect, both do worse than if both had cooperated ($MC > MD$). Hence the dilemma.¹

However, the dilemma's relentless logic and the inherent instability introduced into the relationship by each partner's uncertainty regarding the other's next move may be responsive to deliberate strategies that do not necessarily accept circumstances as given, but rather seek to reshape the alliance structure to create the conditions for robust cooperation. Axelrod and Keohane (1986) and Oye (1986) identified three structural dimensions that serve both as proximate explanations of cooperation and as targets of higher-order strategies to promote cooperation: (1) the pattern of payoffs, (2) the "shadow of the future," (Axelrod, 1984: 124), and (3) the number of players. Firms can reduce behavioral uncertainty and enhance the robustness of cooperation by appreciating the role each dimension plays in partnerships and willfully altering the dimensions as necessary. The theoretical basis of each dimension is outlined next.²

Pattern of payoffs. Payoffs fundamentally affect prospects for the emergence and maintenance of cooperation for at least two reasons. First, the driving force behind alliance formation is each participant's assignment of a net positive value to expected alliance outcomes. If a zero value is attached

¹ In what follows, I use the prisoner's dilemma framework in strategic alliance settings. Thus, the players are alliance partner firms. These firms interact in discrete exchanges (Campbell, 1992). On any given exchange, the potential exists for firms to cooperate (to abide by the letter and spirit of the partnership agreement, deliberately forgoing opportunities for exploitation), or to defect (to violate the agreement). Examples of defection are withholding or distorting information, shirking or failing to fulfill promises, appropriating a partner's proprietary technology or key personnel, making payments late, delivering substandard products, and abruptly abandoning the alliance. Thus, defection can be blatant and massive or subtle and minimal. In the former cases, self-enforcing cooperative agreements terminate (Telser, 1980). In the latter cases, environmental noise problems often complicate the identification of agreement violations, as is noted shortly.

² The following discussion focuses primarily on the structural dimensions of the pattern of payoffs and shadow of the future because the number of players is not a variable but a constant ($N = 2$) for our purposes. Sample selection criteria limited the study's scope to two-firm partnerships, which predominate in the universe of interfirm cooperation (Hergert & Morris, 1988).

to the outcome of mutual cooperation—when direct costs and collateral dysfunctions from alliancing neutralize benefits—little incentive exists for firms to cooperate. And if mutual cooperation is likely to generate net negative outcomes, through leakage of core competencies, for instance, there exists an incentive to avoid cooperation. The expectation of net positive outcomes is captured by the nontrivial payoff condition that mutual cooperation has a value greater than zero ($MC > 0$), which implies that the emergence of cooperation between self-interested autonomous firms reflects anticipated individual gains that are only realizable as the fruits of joint action, through mutual interdependence.

Second, although $MC > 0$ is a necessary condition for initial alliance formation, it is not sufficient to promote robust postalliance cooperation, inasmuch as the stability of a cooperative relationship is a function of the overall payoff structure, or of the relationships among values placed upon outcomes that reflect the two-by-two matrix of behavioral combinations (cooperation or defection by firm A and firm B). As Oye (1986) suggested, payoff differences can be large or small and can increase or decrease, influencing prospects for cooperation through two paths.

Shifts in preferences, either through deliberate strategies or through exogenous events, can transform a situation from one class of game into another, fundamentally altering the character of a relationship. For example, if a firm comes to value the payoff from mutual cooperation (MC) more than the gains possible from unilateral defection (UD) because of such concerns as reputation effects, an evolving cooperative history with the partner, and the commitment of alliance-specific investments, then the relationship structure is transformed from that of prisoner's dilemma ($UD > MC > MD > UC$) to that of a less conflictual game called Stag Hunt ($MC > UD > MD > UC$).³ Or a firm's decision makers may come to believe that continuing cooperation is less advantageous than both partners' breaching understandings (mutual defection); the latter may occur if partners change their strategic goals, find a more attractive alliance partner, or see erosion of their competitive position through the alliance; then, the situation changes from a prisoner's dilemma to a more conflictual game called Deadlock ($UD > MD > MC > UC$).⁴ Thus, dynamic changes in the internal and external environments of

³ The game of Stag Hunt is structured as follows: "A group of hunters surrounds a stag. If all cooperate to trap the stag, all will eat well (MC). If one person defects to chase a passing rabbit, the stag will escape. The defector will eat lightly (UD) and none of the others will eat at all (UC). If all chase rabbits, all will have some chance of catching a rabbit and eating lightly (MD). Each hunter's preference ordering is $MC > UD > MD > UC$. The mutual interest in plentiful venison (MC) relative to all other outcomes militates strongly against defection. However, because a rabbit in the hand (UD) is better than a stag in the bush (UC), cooperation will be assured only if each hunter believes that all hunters will cooperate. In single-play Stag Hunt, the temptation to defect to protect against the defection of others is balanced by the strong universal preference for stag over rabbit" (Oye, 1986: 8).

⁴ Deadlock refers to a class of relationships in which no mutual benefit can be realized
(continued)

firms may alter the initial payoff conditions and contribute to improvement or deterioration of the structural viability of cooperative relationships.

Additionally, the magnitude of the differences among the payoffs within a given class of game can be an important determinant of cooperation if parties expect to interact in the future. In strategic alliances, a very large difference in the gains to be made by violating an agreement (UD) and the payoff from continuing cooperation (MC) will prove to be destabilizing and negatively affect performance. Likewise, if the payoff resulting from both parties' reneging on a contract (MD) is sufficiently high relative to the payoff from cooperation (MC), the arrangement would be jeopardized because whether or not firm B cooperates, firm A can still count on a sizable gain. And finally, prospects for cooperation will decrease the larger the difference between firm A's gains from cheating on firm B (UD) and firm A's losses from firm B's opportunism (UC). Thus, the payoff structure, as captured by the payoff residuals $UD - MC$, $MC - MD$, and $UD - UC$, can be expected to be related to performance, suggesting:

Hypothesis 1: The performance of a strategic alliance will be significantly related to the pattern of payoffs characterizing it.

The shadow of the future. Experimental evidence suggests that although noncooperation emerges as the dominant strategy in single-play situations, under iterated conditions the incidence of cooperation rises substantially (Rapoport & Chammah, 1965). Similarly, in strategic alliances, cooperation is maintained as each firm compares the immediate gain from cheating with the possible sacrifice of future gains that may result from violating an agreement (Telser, 1980). The assumption here seems intuitively reasonable: broken promises in the present will decrease the likelihood of cooperation in the future. By the same token, cooperation in the current move can be matched by cooperation in the next move, and a defection can be met with a retaliatory defection. Thus, iteration improves the prospects for cooperation by encouraging strategies of reciprocity.

Reciprocal behavior is exemplified by a strategy embodied in a computer program called TIT FOR TAT, which consists of "starting with cooperation, and thereafter doing what the other player did on the previous move" (Axelrod, 1984: viii). This simple strategy was the winner in a round-robin computer tournament on the prisoner's dilemma Axelrod conducted, even against very elaborate programs; it works effectively because "future interactions permit the players to reward and punish each other" (Heide & Miner, 1992: 267). Through such expectations of reciprocity—and its corollary, anticipated gains from mutual cooperation—the future casts a shadow back upon the present, affecting current behavior patterns. This

through cooperation. In such cases, where the outcome of mutual defection is preferred to that of mutual cooperation ($MD > MC$), the term "cooperation" becomes devoid of meaning and conflict becomes inevitable (cf. Oye, 1986: 6–7).

bond between the future benefits a firm anticipates and its present actions is called the "shadow of the future." Cooperative performance is better promoted the longer the shadow of the future, or the thicker the nexus between current moves and future consequences, since forward-looking expectations of gains hold in check proclivity toward agreement violations.

The dimensions of the pattern of payoffs and shadow of the future relevant to alliance structure are not orthogonal, but rather, inseparably intertwined. For example, the nonsalvageable assets that are commonly found in interfirm alliances (Williamson, 1983) serve both to alter the payoff structure, by increasing the cost of breaking an agreement, and to lengthen the shadow of the future, by signaling good faith intentions and long time horizons. More broadly, mutually profitable, ongoing interdependence forms the very basis for assessing the shadow of the future; equivalently, a long shadow rests on sustained positive payoffs from mutual cooperation.

Thus, for cooperation to be effective, a nonzero probability of continuing a game must exist. A cooperative relationship may disintegrate if there is a determinate end point, reflecting finite time horizons. As Telser argued, "Self-enforcing agreements are not feasible if the sequence of occasions for transactions has a definite known last element. Although termination is certain to occur sooner or later, when this happens must be uncertain in order to sustain a self-enforcing agreement" (1980: 44). The expectation of continuing interaction is represented in game theory by one-shot (or single-play) games, finitely repeated games (iteration of known length), and infinitely repeated games (iteration of unknown length). Conceptually, most interfirm alliances parallel iteration of unknown length, since they are created with no terminal date. Thus, the level of cooperation between partners may be expected to be positively related to the length of time horizons, which in turn is a positive function of the intended duration of a cooperative relationship and the perceived likelihood of the alliance lasting through the intended duration.

Aside from long time horizons, important elements of relationships that fortify reciprocal behavior and make the shadow of the future an effective promoter of cooperation are frequency of interaction and behavioral transparency (Axelrod & Keohane, 1986). Making interactions frequent means little time elapses between assessments of the outcomes of an alliance, so the next move looms larger than it otherwise would (Axelrod, 1984). As the importance of the next move grows, payoffs from mutual cooperation are subject to a lower discount rate,⁵ temptation to cheat is reduced, and coop-

⁵ Theorists have suggested two reasons behind the discounting of anticipated future payoffs. One is that individuals typically prefer to get a given benefit today, rather than having to wait for it until tomorrow (Shubik, 1975). The other is that there may be no next move. There is some uncertainty whether the interaction will continue because one or the other player may die, go bankrupt, move away, and so on (Axelrod, 1984; Rapoport, 1961). These two effects
(continued)

eration becomes easier, since both sides know that an exploitative move can be met with a reciprocal defection in the next stage (Schelling, 1960). I expected, then, that frequent interactions would strengthen reciprocity, enlarge the shadow of the future, and improve the robustness of cooperation.

But for any given frequency of interaction, a major question still is whether each partner can in fact know what the other firm actually did on the previous round of play. Effective recognition and control capabilities—the ability to distinguish between cooperation and defection by others and to respond in kind—form the bedrock of reciprocity strategies like “tit for tat.” Problems of policeability undermine the capacity of firms to undertake such strategies, since if cheating cannot reliably be detected in a timely fashion, beliefs get separated from reality and the critical link between current actions and future consequences is severed. Spence (1978) called this the problem of imperfect information, which may result from (1) observation lags, reaction lags, or both and (2) an interaction of randomness and inability to monitor the other firm’s choices.

Surmounting the problem of imperfect information requires high behavioral transparency, which refers to the speed and reliability with which alliance partners learn about each other’s actions. Dependence on noisy, indirect observations vastly complicates self-enforcing agreements (Kreps, 1990), and indeed, recent analytical and empirical work shows that monitoring problems caused by noise significantly impair the effectiveness of “tit for tat” in prisoner’s dilemma (Bendor et al., 1991). To the extent that information about moves can be garnered reliably and accurately, behavioral transparency improves and the future remains bonded to the present. Yet effective reciprocity turns not only on the identification of agreement violations, but also on the timing of a suitable reply. The time taken to respond has important signaling properties, and fast reactions are important because the power of signals fades with time (Chen & MacMillan, 1992).

In sum, long time horizons, frequent interactions, and high behavioral transparency encourage reciprocal behavior. Thus, severally and jointly, these factors lengthen the shadow of the future and promote cooperative outcomes, suggesting:

Hypothesis 2: The performance of a strategic alliance will be positively related to the length of the “shadow of the future” that is cast.

The Transaction Cost Paradigm of Industrial Organization

Just as game theory provides concepts and insights that elegantly capture the incentives and motivations present in various classes of relationships, the transaction cost paradigm provides a useful lens through which

combine to make expected future payoffs less important than present ones; the degree to which the payoff of the next move is discounted relative to the payoff of the current move is called the discount rate.

researchers can view essential aspects of alliances. One such aspect is the "private ordering" (Galanter, 1981) that occurs in voluntary cooperative relationships. As Williamson (1983) argued, firms often devise self-enforcing agreements because two assumptions common to both law and economics—that efficacious rules of law regarding contract disputes are in place and that the courts will apply those rules in an informed, sophisticated, and non-costly way—often do not seem valid. Faced with high costs of court adjudication, firms are reluctant to resort to courts or other third-party policing mechanisms and rely instead on private ordering.

In private ordering, self-enforcing agreements are devised in such a way that if one party violates an agreement, the other party's only recourse is to terminate it. Such an arrangement implies high mutual interdependence and creates exposure to a partner's potential opportunism, since promises are not always kept and contracts are not always sacred (Freeman, 1987; Reich & Mankin, 1986). Though rather dire, this observation simply mirrors "human nature as we know it" (Knight, 1965: 270) or Machiavelli's efforts to deal with "men as they are" (Gauss, 1952: 14). Indeed, it forms the core of Williamson's "contractual man" (1985: 43-63), who is "boundedly rational" and who acts opportunistically, with guile.

However, scholars have increasingly challenged the "assumption that managers have an underlying propensity to behave opportunistically" (Barney, 1990: 384; Bromiley & Cummings, 1991; Granovetter, 1985; Hill, 1990), suggesting instead that Williamson's solution to the problem of cooperation is unduly skewed toward short-term exploitation. The question of the actual prevalence of opportunism in interfirm alliances can hardly be resolved through armchair theorizing or through sweeping axiomatic statements about human nature; it can only be settled empirically. It is probably fair, however, to assert that opportunism is neither as ubiquitous as a Machiavellian worldview projects, nor as wanting as an altruistic worldview connotes. So the real question is to differentiate opportunists from nonopportunists, a task rendered difficult by the opacity of opportunistic inclinations (Williamson, 1985).

One obvious answer to that problem is for an alliance partner to rely on the record of its counterpart's cumulative past behaviors as a guide to future behavior, or to use reputation as a proxy for knowledge of opportunistic intentions. Hill (1990) suggested that actors will try to avoid entering an exchange with another actor who has a questionable reputation and, if avoidance is not viable, they will demand that the potentially opportunistic party absorb bonding costs when they enter into an exchange with it. In addition, the other actors will have to bear monitoring costs in order to detect opportunism. The bonding and monitoring costs will absorb much of the expected benefit from the alliance, so that "*the value created by exchanges involving actors of questionable reputation is significantly reduced by the need to set up safeguards to limit opportunism*" (Hill, 1990: 505, emphasis in original).

But frequently, information on a potential partner's past behaviors does

not exist in the public domain. Thus, in an environment of questionable reputation, or absent any reputation at all, the design of appropriate governance structures should be partly a function of the perceived probability of opportunism. A heightened perception of opportunistic behavior would mobilize governance structures involving great coordination efforts and compliance costs, including high outlays for drafting, negotiating, monitoring, and enforcing contingent claims contracts, outlays collectively referred to as transaction costs. And since "transaction costs are the economic equivalent of friction in physical systems" (Williamson, 1985: 19), as Coase (1937) first argued, perceptions of high opportunism may lead to diminished performance levels, suggesting:

Hypothesis 3: The performance of a strategic alliance will be negatively related to the extent to which the parties perceive each other as behaving opportunistically.

The perception of opportunistic behavior, however, is not constant within a given relationship; many theoretical perspectives that seek to explain its progressive diminution with a growing cooperative history center on its psychological converse, trust. Social psychologists (Deutsch, 1973; Rempel, Holmes, & Zanna, 1985) have abstracted three key points about the dynamics of cooperation: (1) Trust evolves out of past experience and prior interaction; thus, it develops as a relationship matures. (2) Partners attribute dispositions to their partners, regarding them as, for instance, reliable, dependable, and concerned with providing expected rewards. (3) With growing trust, there is an increasing willingness to put oneself at risk, be it through intimate disclosure, reliance on another's promises, or sacrificing present rewards for future gains.

Dwyer, Schurr, and Oh (1987), Anderson and Weitz (1989), and Campbell (1992) applied these notions in the context of industrial marketing, arguing that older dyads continue because experience breeds trust. The older a relationship, the greater the likelihood it has passed through a critical shakeout period of conflict and influence attempts by both sides. If a dyad survives this period, the foundation is laid for personal trust, mutual liking, and a good working relationship. Further, even without passing through crises, partners come to learn each other's idiosyncrasies and to have deeper mutual understanding over time, which improves the affective quality of the relationship. To summarize, with an evolving history, each partner has the opportunity to assess the willingness and ability of the other to abide by the letter and spirit of the partnership agreement. The better the match between expectations and past outcomes, the more confident a firm's decision makers will be in believing that a partner will follow through on its current promises, suggesting:

Hypothesis 4: The level of perception of opportunistic behavior will be negatively related to the history of cooperation between the partners in a strategic alliance.

Achieving a trusting relationship, or more generally, a reputation for

trustworthiness, is therefore not costless or spontaneous. Its cultivation requires deliberate strategies of forbearance, with eyes trained on future pay-offs, and accumulated evidence of nonreneging behaviors. Fear of opportunism plays a pivotal role in alliance structuring until such trust develops, not because all economic agents behave opportunistically all of the time, but because "some agents behave in this fashion and it is costly to sort out those who are opportunistic from those who are not" (Williamson & Ouchi, 1981: 351).

Thus, individual gains achieved through strategies of joint action and interdependence also exact a toll; the combination of asset specificity and behavioral uncertainty, exacerbated by bounded rationality, generates fresh transaction costs (Williamson, 1983), diminished control and flexibility over resources (Pfeffer & Salancik, 1978), and firm vulnerability (Gupta & Singh, 1990). These challenges set in motion measures, both *ex post* and *ex ante*, as firms attempt to reduce the risk of unrequited cooperation. Generically, these strategies seek to alter the payoff structure in order to reduce gains from cheating, increase gains from cooperation, or increase costs of agreement violations.

Incentives for opportunism are inhibited, for example, by prospective punishments after the fact. These *ex post* deterrents consist of contractual safeguards, or stipulations in a formal partnership agreement, that inflict penalties for the omission of cooperative behaviors or commission of violative behaviors. Such safeguards are structurally embedded deterrents to opportunism and can theoretically be expected to vary proportionally with the perception of opportunistic behavior, both before and after alliance formation.

As Williamson (1985) noted, in the absence of opportunism, it would suffice for both parties to agree always to adapt to unanticipated contingencies in a jointly optimal way and always to share profits according to some general rule established in advance. Such sequential adaptations would not pose risks if one party could trust the other to behave honestly (Gambetta, 1988). In such cases, the initial agreement document can be very incomplete, with the gaps to be filled in by the parties as actual choices need to be made. Conversely, perceived opportunism would lead to a prealliance contract in which numerous contingencies are recognized and appropriate adaptations are stipulated for each. After alliance formation, a continuing correspondence between *ex post* deterrents and perceived opportunism would be likely. A sustained matching of observed behaviors with expectations of cooperation may reduce the fear of opportunism, as trust grows and costly stipulations are gradually rescinded; but if actual alliance outcomes give rise to a high fear of exploitation, then contractual safeguards developed initially may subsequently be fortified, suggesting:

Hypothesis 5: The extent of the perception of opportunistic behavior and the level of contractual safeguards embedded in a strategic alliance will be positively related.

Ex ante strategies offer another way of enhancing the robustness of cooperation and diminishing the attractiveness of defection. For example, it was noted that a very large difference between the gains to be made by abandoning an alliance unilaterally and continuing mutual cooperation will jeopardize alliance stability. Placing nonredeployable assets in an alliance (Williamson, 1983) can help shrink the residual ($UD - MC$), promoting sustained cooperation. More broadly, ex ante measures seek to equalize the exposure of the parties (Heide & John, 1988) and to counterbalance the fear of opportunism by a show of good faith, embodied in reciprocal agreements, such as guaranteed purchase of each other's products and services at guaranteed prices, and commitment of other types of nonrecoverable investments (Teece, 1986). Nonrecoverable investments include specific physical assets like plant and equipment and also site specificity, human asset specificity, and dedicated assets (Smith & Aldrich, 1991; Williamson, 1985). In each case, these involve alliance-specific costs (1) that are incurred in advance of alliance commencement and (2) whose value for alternative uses is greatly reduced, sometimes to the level of scrap value only. In other words, these costs are largely sunk.

Nonrecoverable investments thus represent a gamble, a risky decision supported by expectations that the present value of discounted future pay-offs from mutual cooperation will exceed such sunk costs. Expectations, however, can remain unfulfilled as a result of "moral hazard or adverse selection" (Williamson, 1985: 47),⁶ rendering a firm vulnerable to committing resources to a nonredeployable asset or to an arrangement with high opportunity cost. The emphasis here is not on specific types of investments, which may vary with alliance type, but on the ex ante willingness of parties to yield control over what are often substantial resources. The more an alliance partner sees the other party as likely to behave opportunistically, the greater will be such perceived vulnerability, and the greater will be the first partner's aversion toward making nonrecoverable investments. Hence,

Hypothesis 6: The level of commitment of nonrecoverable investments in a strategic alliance will be negatively related to the perception of opportunistic behavior.

Nonspecific assets, such as general-purpose trucks and airplanes, are salvageable if agreements break down; such assets therefore provide no clear cues about desire to cooperate or to defect. But since nonrecoverable investments reduce a partner's gains from cheating, they may also induce trust and

⁶ Recognized prominently in the insurance industry literature, the term "moral hazard" refers to the failure of insured parties to behave in responsible ways and to take appropriate risk-mitigating actions, and the term "adverse selection" refers to the inability of insurers to distinguish between risks and the unwillingness of high-risk insured parties to candidly reveal their true risk condition (Williamson, 1985).

decrease one's own fear of exploitation (Schelling, 1960) by signaling calculations of payoffs from mutual cooperation stretching well into the future. Hence,

Hypothesis 7: The commitment of nonrecoverable investments in a strategic alliance will be positively related to the length of time horizons.

Extending this logic, several authors have noted that alliances supported by a high degree of commitment of nonrecoverable investments are more likely to be stable, high performers (Freeman, 1987; Smith & Aldrich, 1991). Alliance-specific investments provide the credible commitments that buttress mutual assurances (Williamson, 1985); as suggested above, they intimate long time horizons over which expected gains from mutual cooperation recoup current costs. The implied pledge of nondefection may in turn reduce the frictional effects of perceived opportunism, acting as a lubricant in lowering transaction costs and raising the efficiency of the governance structure of an alliance. Heide and John (1988), studying long-term vertical channel relationships, found empirical support for this analysis. They concluded that "financial performance was improved . . . provided specific investments were relatively high" (1988: 20). Therefore,

Hypothesis 8: The commitment of nonrecoverable investments in a strategic alliance will be positively related to performance.

Credible commitments, however, are not necessarily inviolable commitments. Although they suggest a strategy of cooperation, they provide no ironclad guarantee of nondefection in the face of shifting circumstances, such as the gains of cheating growing to outweigh the loss of nonrecoverable investments. The incentive alignment capacity of ex ante measures in alliance structuring may therefore be augmented by ex post measures designed to cope with this behavioral uncertainty. The larger the potential losses from being exploited by a partner (the smaller the payoff of unilateral cooperation), the more a firm will be driven to protect its flanks and reduce its vulnerability by resorting to ex post remedies in the form of a tight legal document that incorporates strong safeguards. Hence,

Hypothesis 9: The extent of payoffs from unilateral cooperation will be negatively related to the level of contractual safeguards embedded in a strategic alliance.

Conversely, frequent interactions, long time horizons, and high behavioral transparency can combine to lengthen the shadow of the future. Under these circumstances, uncertainty regarding potential opportunism is reduced and the necessity of formalizing understandings regarding potentially disputable matters between alliance partners through ex post deterrents is lessened, suggesting:

Hypothesis 10: The extent of contractual safeguards in an alliance will be negatively related to the length of the "shadow of the future" cast.

Figure 1 represents the hypothesized interactions coupling game theory and transaction cost insights.

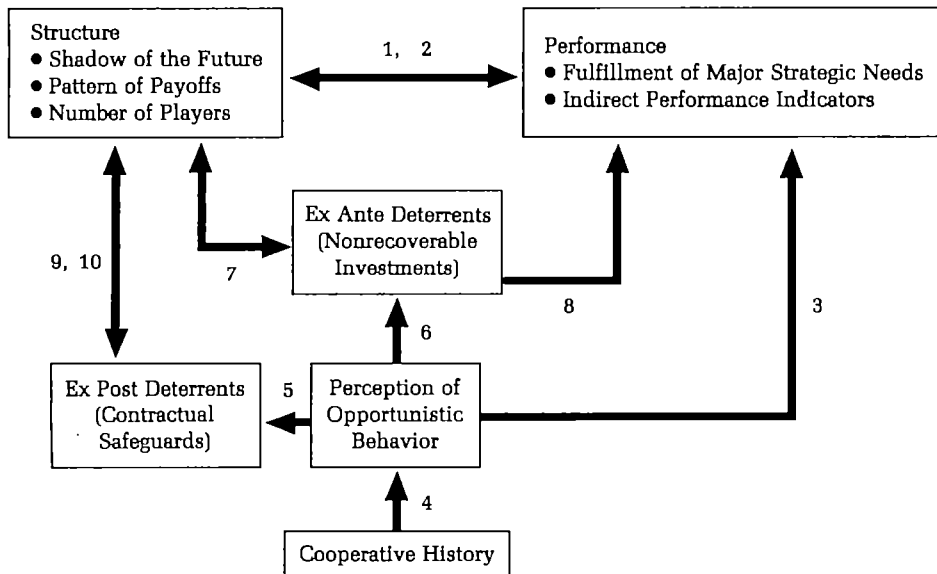
METHODS

Data

Since under investigation in this study was the structuring of mixed-motive (competitive and cooperative) interfirm partnerships, the ideal data would have been drawn from the total population of such alliances. In practice, however, it was not feasible to draw a random sample from such a broad population. Instead, I sacrificed a degree of external validity and chose firms to study judgmentally, with the hope that relationships among the focal variables could be examined while other factors were held relatively constant (Cook & Campbell, 1979).

Five sample selection criteria were employed: (1) time period, (2) industrial scope, (3) firm nationality, (4) number of participants, and (5) nature of participants. The first criterion was an attempt to capture the recent rapid growth of alliances and major trends of current and future relevance by selecting alliances formed between 1983 and 1988. The second criterion implied that certain industries were the most prolific in alliance activity

FIGURE 1
Analytical Framework^a



^a Numbers shown correspond to the hypotheses tested.

(Hergert & Morris, 1988; Hladik, 1985) and targeted these groups: chemicals and allied products (Standard Industrial Classification [SIC] code 28); machinery, except electric (SIC 35); electrical and electronic equipment (SIC 36); and transport equipment (SIC 37). The third criterion allowed deletion of alliances without at least one U.S. partner and was important primarily because of constraints on access, time, and funding. The fourth criterion allowed inclusion of partnerships with two members only, since a vast majority (81%) of alliances are between two firms (Hergert & Morris, 1988). The fifth criterion restricted the study to interfirm, for-profit alliances, even though there is important (and increasing) cooperation between business and universities, business and government, and government and universities. Taken together, these five criteria generated a domain of inquiry that was relevant and significant and that met the needs of this research particularly well.

Data Collection

Data collection proceeded in three phases. In the first phase, an original group of 342 firms was constructed. Phase two consisted of designing a data collection instrument that could effectively gather data on the relevant variables. In phase three, I pooled the results of the first two phases with personal interviews and survey literature to conduct a nationwide mail survey of senior executives.

Phase one. The primary source for original firm selection was Funk and Scott's *Index of Corporate Change* for the period 1983–88. I added depth to the data by cross-checking and supplementing relevant facts on alliance activity by referring to the original citations in the *Index*. Numerous citations of probable future alliance activity were excluded because proposed alliances frequently do not materialize. Application of the above selection criteria generated a gross data set of 396 firms.

These firms were checked in the *Standard & Poor's Register of Corporations, Directors and Executives* to obtain the name of an executive in each firm likely to be able to complete the survey and his or her title, complete address, and phone number. I chose executive vice presidents unless another person more clearly matched the needs of this survey, as would, for instance, a vice president for joint ventures. Where neither officer could be found, I targeted a higher-level executive.⁷ This process yielded 349 firms,

⁷ Determining the best person within each organization to meet the purposes of this study was an important concern. Researchers have often ignored the question of whether organization members at different hierarchical levels perceive the same organizational phenomena similarly (Lincoln & Zeitz, 1980); where variation exists, relying on key informants at the top of an organization may be misleading. I decided to target the executive most directly responsible for alliances to get hierarchically as close as possible to the person who was sufficiently senior to be cognizant of the strategic goals to be served by an alliance yet also intimately familiar with its structuring, operations, and performance aspects. Only when such a corporate officer was not listed by name and title, I chose successively higher hierarchical levels: executive vice

(continued)

each of which I telephoned to verify the accuracy of available information and to request assistance in this research project. After 7 companies that had ceased to exist were deleted, the final study group contained 342 firms.

Phase two. The questionnaire performs the actual interrogation function in a mail survey and therefore warrants considerable attention. The design and administration of the questionnaire in this study heavily relied on the "total design method" of Dilman (1978), who used social exchange theory to develop various ways to encourage response. I implemented most of those suggestions.

To generate measurement items, exploratory research can use several techniques: literature searches, experience surveys and focus groups involving relevant actors (in our case, experienced executives who could offer ideas and insights into alliances), and analysis of critical incidents (Churchill, 1979; Nunnally, 1978). Wording and question construction for this study began with a review of the literatures cited earlier, with a special focus on generating a pool of items that tapped the core theoretical constructs shown in Figure 1. Business school faculty members and doctoral students were used as expert judges to assess the face validity of the selected items, some of which were developed specifically for this study because of the paucity of prior empirical work in this area. (However, some published items were also adapted.) After several iterations of item editing and refinement, I performed a content analysis to determine the overlap of the remaining items with the conceptual domain of the constructs. With the resulting instrument, I conducted pretest interviews with alliance-experienced executives in Philadelphia and Baltimore to identify any problems with question wording and questionnaire layout. These interviews, which ranged from 70 to 130 minutes, yielded many useful suggestions that strengthened the content and concurrent validities of the instrument.

Phase three. Effective mail survey administration seeks to maximize response rate through various techniques (Dilman, 1978). In this research, I took the following sequential steps: (1) made executive preidentification phone calls before mailing the first wave of surveys, (2) mailed the first wave, (3) sent reminder-thank you postcards to all executives, (4) mailed a second wave of surveys to nonrespondents, and (5) made follow-up phone calls to all second-wave recipients.

Respondents

Of the 342 senior executives receiving questionnaires, 140 (41%) responded. Twenty-nine responses were unusable because of missing data, leaving 111 (33%) usable responses. This response rate significantly exceeded the 15–24 percent range reported in similar published studies (e.g.,

president, president, and CEO. This selection strategy reflected the assumption that different knowledge levels exist about various organizational phenomena and targeted the people believed to be best able to answer my research questions.

John, 1984; Provan & Skinner, 1989) and was especially satisfactory considering the study's requirement for direct senior executive involvement and the sensitivity of some of the requested information. Approximately 60 percent of the usable responses came from the individuals most directly responsible for the alliances, usually functional vice presidents; 21 percent came from executive vice presidents, and 19 percent came from chairmen or presidents.

Possible nonresponse bias was examined by comparing survey respondents' ($N = 111$) demographic characteristics with those of nonrespondents and those returning unusable responses ($N = 231$). A one-way between-groups analysis of variance (ANOVA; $df = 2,339$) resulted in a statistically nonsignificant F of 1.4300 for firm sizes ($p = .2475$). Similarly, chi-square difference tests between the two groups for primary product categories and primary geographic markets yielded respective chi-square values of .87 ($df = 3$, n.s.) and .02 ($df = 2$, n.s.). Thus, the responding firms did not differ materially from the nonresponding firms on firm size, industry sector, or geographic market served.

Threats to Validity and Countermeasures

Although this study's high level of response from knowledgeable executives closely involved in structuring and running alliances was encouraging, it did not address potential problems of common method variance (Campbell & Fiske, 1959) or related concerns about the consistency motif and the social desirability problem (Podsakoff & Organ, 1986: 534–536). When self-reported data on two or more variables are collected from the same source at one time, correlations among them may be systematically contaminated by any defect in that source. Yet at times reliance on key informants may be the only realistic, feasible way to get the information desired (Huber & Power, 1985), and "the practical utility of same-source self-report measures makes them virtually indispensable in many research contexts" (Podsakoff & Organ, 1986: 540), such as the present study. To deal with the resulting issues of artifactual covariance, several statistical, post hoc, and procedural remedies are available (Harman, 1967; Hill, Hitt, & Hoskisson, 1992; Keats & Hitt, 1988; MacKenzie, Podsakoff, & Fetter, 1991; Podsakoff, MacKenzie, Moorman, & Fetter, 1990); I used several of these in this research as a precaution against problems resulting from the subjective nature of many of the survey items.

Multiple raters. Validity of the data set was checked by mailing an identical questionnaire to alternate senior executives from a random subset ($N = 50$) of the responding firms. Fourteen executives returned these independently completed questionnaires. Significant, positive correlations between the responses (see Table 1) provided strong evidence of interrater reliability. This high degree of agreement between multiple respondents strengthened confidence in the survey's validity.

Secondary data. Available data can often be tested for convergence by

triangulation with secondary data (cf. Keats & Hitt, 1988), but in this study, the fact that information on most variables of interest was alliance-specific and not available from published sources constrained independent corroboration of questionnaire responses. However, there was one exception: the cooperative history measure. I compiled an archival record of each respondent firm's prior association with its partner, entering number and duration of previous alliances, from the *Wall Street Journal Index*, going back to 1966. The congruence of data obtained in 106 of the 111 cases (95.5%) supports the history measure's validity and may also reflect favorably on the likely accuracy of other reported data.

Scale reordering. This procedural method, suggested by Salancik and Pfeffer (1977), seeks to reduce the effects of consistency artifacts by arranging the items on a self-report questionnaire so that measures of the dependent variables follow, rather than precede, the independent variables. I reversed this method, however, by placing the alliance performance measures before the measures of perception of opportunistic behavior and the structural variables. Although Podsakoff and Organ suggested that "the correlations would be similar using either method" (1986: 540), I felt that for the purposes of this study, such a questionnaire design would yield less biased performance assessment from respondents than the recommended scale ordering.

Factor analysis. The final check involved Harman's single-factor test (Harman, 1967), a post hoc statistical test also used by Greene and Organ (1973) and Podsakoff, Todor, Grover, and Huber (1984). The assumption underlying the test is that if a substantial amount of common method variance exists in data, a single factor will emerge from factor analysis when all variables are entered together, or a general factor that accounts for most of the variance will result. Here, the results of unrotated factor analyses revealed neither a single nor a general factor, suggesting that any systematic variance common to the measures was lacking. Furthermore, refitting the model (Figure 1) with a same-source first-order factor added to extract common method variance (MacKenzie et al., 1991) permitted an investigation of whether same-source bias consistently and significantly inflated or deflated the hypotheses test results. No such patterns were discernible with this extra factor in the analysis.

Measures

Performance. To cover the breadth of this construct, a principal components analysis with "varimax" rotation was performed on items tied to financial, operational, and effectiveness dimensions, as recommended by Venkatraman and Ramanujam (1986). This analysis produced two factors with eigenvalues greater than one, which together accounted for 58 percent of the variance in the data.

The first factor, fulfillment of major strategic needs, explained 37.7 per-

cent of the variation and had an eigenvalue of 5.77. It represented the logic that when very important strategic needs are being met very well, an alliance can be said to be performing well. The scale was based on 16 items from Contractor and Lorange (1988). The Appendix further discusses these and the other items used in this study and gives their response formats and alpha reliabilities.

The second factor, indirect performance indicators, explained an additional 20.7 percent of the total variation and had an eigenvalue of 3.19. This factor captured other critical dimensions of alliance performance, including net spillover effects for the parent firms, relative profitability, and overall performance assessment.

Structure. As noted earlier, the specific factors that strengthen reciprocity and make the shadow of the future an effective promoter of cooperation are behavioral transparency, frequency of interaction, and long time horizons. Behavioral transparency is a function of the speed and reliability with which alliance partners learn about each other's actions. Speed was measured on a scale specifying four ranges ("over 1 month" to "within 1 day") and reverse-scored. Reliability was measured by asking about the source and accuracy of information regarding a partner's behavior, with a choice of sources typically used (own firm's employees, alliance itself, partner firm) and a four-point range of accuracy ("never" to "always"). An additive model was postulated to represent behavioral transparency: $\text{transparency} = \text{information source} + \text{information accuracy} + \text{time lag}$.

Frequency of interaction was assessed with two items, one asking the number of senior executive meetings occurring annually and the other assessing lower-level interactions. The business press has documented the importance of top management commitment and involvement for the success of alliances, but less well-recognized is the reality that regular communication at operational levels is equally critical and, indeed, that alliances can flourish or be destroyed at these lower levels. The two components were therefore weighted equally. The length of time horizons was measured as the product of two items, the intended duration of an alliance and the perceived likelihood of the alliance lasting through the intended duration.

The payoff structure was completed by the respondents using a four-cell matrix in which one cell, mutual cooperation, served as the anchor. Respondents estimated their own payoffs under the other behavioral combinations using the instructions given in the Appendix. This measure exhibited a high test-retest reliability (.91) in a pilot test on executives participating in the pretest interviews over the suggested two-week interval (Peter, 1979). Further, at least three considerations support my approach of estimating payoffs in relation to an anchor: (1) The magnitude of payoffs for each participating firm may vary greatly, depending on the scale of the alliance and the level of commitment of each partner. However, my central concern was the relationships among the payoffs. (2) Not asking executives to reveal the absolute amounts of payoffs in each scenario, but only the relative amounts, should greatly heighten the likelihood of response. (3) Interval-scale preference or-

derings of payoffs can sufficiently capture the motivations and incentives of firms in alliances.⁸

Perception of opportunistic behavior. Respondents were asked to describe the potential for their partner's behaving opportunistically using John's (1984) six-item scale, which similar studies (e.g., Provan & Skinner, 1989) have also employed.

Ex ante and ex post deterrents. Survey respondents were also asked to assess the strength of the deterrents to opportunism in their alliances, which theoretically should correspond to the perception of opportunistic behavior. The level of ex ante deterrents was gauged as the degree of potential loss that would occur through nonrecoverable investments in the event of alliance dissolution. The level of ex post deterrent use was assessed with a list of contractual safeguards developed from a computer-aided search of the relevant legal literature (cf. Macneil, 1978, 1981; Narasimhan, 1989; Practicing Law Institute, 1986) and corroborated by the senior executives participating in pretest interviews. I arranged the safeguards in a presumed order of increasing stringency (see the Appendix) and assigned each its corresponding value. For example, the first safeguard had a value of 1, the fourth, 4, and so on. A composite index of ex post deterrents was computed as $\sum_i (\text{safeguard used})/36$, where the denominator is the summation of all i ($i = 8$).

Cooperative history. If there were no prior alliances between two partners, the variable was equal to zero; otherwise, its value was the product of the number of alliances the two firms had participated in and the number of years the two firms had been partners.

Control Variables

In order to extract possible confounds, I identified three important control variables: firm size, the primary product categories of alliance partners, and the top geographic markets served by the partners. These variables may be important because, for instance, alliance performance may be spuriously higher in large firms, be lower in industries that are suffering, or be a function of specific country or market conditions. Removing the effects of these variables improves confidence that the findings center on the hypothesized relationships, above and beyond the effects of exogenous influences at the firm, industry, and national levels. I defined firm size as annual sales in millions of dollars. Primary geographic market, a dummy variable set equal to zero for the U.S. market and set equal to one for the Japanese market, resembled a variable developed by Hitt, Hoskisson, Ireland, and Harrison

⁸ Because utilities were measured on an interval scale (Rapoport, 1961: 125), comparisons of payoff magnitudes could legitimately be used to assess alliance stability. Furthermore, as Table 1 shows, the data satisfy three inequalities characteristic of prisoner's dilemma: (1) $MC (\$1.00) > 0$ (anchor condition); (2) $UD > MC > MD > UC - 1.73 > 1.00 > .41 > -1.28$; (3) $2MC > (UD + UC)$; $2 > (1.73 - 1.28) = .45$. The last condition precludes players from taking turns exploiting each other in order to earn higher payoffs than are possible through mutual cooperation (Axelrod, 1984: 10).

(1991: 698). Primary product category was replaced by four dummy variables coded as a zero, one for each SIC code studied (28, 35, 36, and 37).

Analyses

For Hypotheses 1 and 2, the multidimensional measurement of performance developed in this study suggested the use of a data analytic technique capable of uncovering complex patterns of relationships involving sets of dependent and independent variables. I therefore tested the two hypotheses using canonical correlation analysis, a part of the SPSS-X MANOVA package. In this package, the WITH subcommand (SPSS, 1988: 571) permits the effects of control variables to be parcelled out.

Regression analyses were used to test the remaining hypotheses. When variables are ordinally scaled, such analyses deviate from the regression assumption of interval data (Michel & Hambrick, 1992). However, the work of Michel and Hambrick (1992: 26), Keats and Hitt (1988), and others has suggested that the use of an ordinal scale is not a serious problem.

RESULTS

Table 1 shows the means, standard deviations, and correlations for all variables.

Hypotheses 1 and 2 state that an alliance's performance will be significantly related to its pattern of payoffs and the shadow of the future, respectively. Table 2 reports the canonical loadings (the variate-variable correlations), the percentage of explained variance in the variables accounted for by the variate, and the redundancy coefficients (the amount of variance in one set of variables accounted for by the other canonical variate) for these two hypotheses.

The results do not support Hypothesis 1. Although theoretically expected directionalities were found, in a negative association of performance with payoff residuals UD - MC and UD - UC and a positive association with MC - MD, the second variate was nonsignificant; further, the first canonical correlation (.38) was significant only at the $p < .10$ level. These extremely marginal results suggest that the relationship between payoffs and performance is more complex than Hypothesis 1 predicts.

Hypothesis 2 was strongly supported. Table 2 shows significant F-values, substantial explained variance, and high canonical correlations. Under the typical cutoff of .30 used to interpret canonical loadings, the results from the first canonical variate suggest that transparent behaviors and frequent interactions tend to be associated with the fulfillment of important strategic needs. Results from the second canonical variate indicate that the expected durability of a cooperative relationship tends to be positively associated with favorable net spillover effects, greater relative profitability, and higher overall alliance performance assessment.

Performance was predicted to be negatively related to the extent of the perception of opportunistic behavior (Hypothesis 3) and positively related to

TABLE 1
Descriptive Statistics and Correlations^{a,b}

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Fulfillment of major strategic needs	0.37	0.12	(.92)													
2. Indirect performance indicators	9.73	1.83	.71	(.81)												
3. Behavioral transparency	0.30	0.19	.23	.14	(.83)											
4. Frequency of interaction	0.92	0.13	.27	.18	.39	(.91)										
5. Length of time horizon	9.30	3.77	.32	.25	.06	.23	(.90)									
6. Payoff from unilateral defection	1.73	0.73	-.07	-.09	-.28	.03	-.09	(.86)								
7. Payoff from mutual defection	0.41	0.58	.15	.11	.18	.02	.11	-.16	(.80)							
8. Payoff from unilateral cooperation	-1.28	1.39	.10	.07	.03	.14	.19	-.13	-.09	(.84)						
9. Perception of opportunistic behavior	0.38	0.12	-.21	-.25	-.09	-.17	-.04	.07	-.11	-.18	(.88)					
10. Cooperative history	27.10	43.12	.24	.27	.04	-.19	.17	.00	.07	-.01	-.22	(.96)				
11. Nonrecoverable investments	2.11	0.79	.33	.18	.01	.12	.23	.03	-.04	-.21	-.22	-.18	(.83)			
12. Contractual safeguards	0.55	0.20	.05	.11	-.04	-.08	.10	.19	.02	-.31	.15	-.03	.26	(.91)		
13. Firm size	8,691	22,210	-.04	.18	.07	.03	.03	-.11	.07	.18	-.21	.37	.06	.19		
14. Primary product category	1.80	3.10	.05	.01	.10	.07	-.07	.06	.09	.04	.12	-.07	.03	-.08	.13	
15. Primary geographic market	0.18	0.26	.07	.03	.09	.11	.18	.07	.04	-.08	.15	.03	.08	.11	.09	.19

^a Means and standard deviations for cooperative history are based on $N = 29$. For all other variables, $N = 111$.

^b All correlations above $r = .18$ are significant at $p < .05$; numbers in parentheses show interrater reliabilities calculated as part of validity checks ($N = 14$).

TABLE 2
Results of Canonical Correlation Analyses^a

Hypothesis	Variables	First Canonical Variate Loadings	Second Canonical Variate Loadings
1	Payoff structure		
	Residual (UD - MC)	-.17	.09
	Residual (MC - MD)	.33	-.16
	Residual (UD - UC)	-.06	.38
	Explained variance	18.68	12.06
	Performance		
	Strategic needs	.31	-.12
	Indirect performance indicators	.04	-.25
	Explained variance	15.51	11.92
	Approximate F	2.18	.87
	df	18,189	18,189
	p	<.08	n.s.
	Redundancy	.17	.02
	Canonical correlations	.38	.17
2	Shadow of the future		
	Frequency of interaction	.63	.21
	Behavioral transparency	.74	.03
	Time horizon	.18	.58
	Explained variance	36.41	19.02
	Performance		
	Strategic needs	.51	.17
	Indirect performance indicators	.13	.43
	Explained variance	41.73	16.40
	Approximate F	7.86	3.07
	df	18,189	18,189
	p	<.001	<.01
	Redundancy	.11	.17
	Canonical correlations	.81	.36

^a Loadings higher than .30 are shown in boldface.

the extent of nonrecoverable investments (Hypothesis 8). Table 3 shows results. Hypothesis 3 was supported by the finding that after firm size, primary product category, and primary geographic market are controlled, the perception of opportunistic behavior has a significant, negative effect on alliance performance. The perception of opportunistic behavior and the set of control variables explained .36 of the variance in performance (adjusted $R^2 = .31$). The results also provide support for Hypothesis 8, with .29 of variance explained (adjusted $R^2 = .19$).

Contractual safeguards were positively linked by Hypothesis 5 to the perception of opportunistic behavior, negatively linked by Hypothesis 9 to the payoff from unilateral cooperation, and negatively linked by Hypothesis 10 to the shadow of the future. Again, the results, shown in Table 4, are straightforward. Hypothesis 5 (model 1, Table 4) found modest support ($\beta =$

TABLE 3
Results of Regression Analyses for Performance^a

Variables	Hypothesis 3		Hypothesis 8	
	Fulfillment of Major Strategic Needs	Indirect Performance Indicators	Fulfillment of Major Strategic Needs	Indirect Performance Indicators
Control variables				
Firm size	-.02	.11	.02	.09
Primary product category	.08	-.03	.02	.06
Primary geographic market	.02	.07	.06	.01
Perception of opportunistic behavior	-.23**	-.21**		
Nonrecoverable investments			.26**	.17*
R ²		.36		.29
Adjusted R ²		.31		.19
F		5.87***		3.06**

^a Entries represent standardized regression coefficients, $N = 111$.

* $p < .05$

** $p < .01$

*** $p < .001$

.18, $p < .05$, adjusted $R^2 = .06$). Hypothesis 9 (model 2) was strongly supported by a highly significant, negative regression coefficient ($\beta = -.39$, $p < .001$), explaining .21 of the variance (adjusted $R^2 = .14$). Finally, the results showed support for Hypothesis 10 (model 3), since regressing behavioral transparency, frequency of interaction, length of time horizons, and the control variables on contractual safeguards yielded a significant R^2 of .22 (adjusted $R^2 = .12$) and highly significant regression coefficients for behavioral transparency ($\beta = -.23$, $p < .01$) and length of time horizons ($\beta = -.31$, $p < .001$). However, the coefficient for frequency of interaction was not significant.

It was predicted that negative relationships would exist between the perception of opportunistic behavior and cooperative history (Hypothesis 4) and between the perception of opportunistic behavior and nonrecoverable investments (Hypothesis 6). Results supported both hypotheses. Regression analyses including the set of three control variables showed significant results for Hypothesis 4 ($\beta = -.19$, $p < .01$, adjusted $R^2 = .10$) and Hypothesis 6 ($\beta = -.17$, $p < .05$, adjusted $R^2 = .08$).

However, this support for Hypotheses 4 and 6, though significant, should nonetheless be regarded with caution. As Table 1 indicates, 82 firms had no prior collaborative experience with their partners, suggesting perhaps that many firms are getting on the strategic alliance bandwagon for the first time. Data for analyzing Hypothesis 4 therefore comprised only 29 highly heterogeneous cases, with the number of previous alliances ranging from 1 to 13 and their durations ranging from 1 to 20 years. Further, in developing Hypothesis 6, I noted that the decision to commit nonrecover-

TABLE 4
Results of Regression Analyses for Contractual Safeguards^a

Variables	Contractual Safeguards		
	Model 1	Model 2	Model 3
Control variables			
Firm size	.14†	.08	.17*
Primary product category	-.03	-.08	.03
Primary geographic market	.04	-.02	.08
Perception of opportunistic behavior	.18*		
Payoff from unilateral cooperation		-.39***	
Shadow of the future			
Behavioral transparency			-.23**
Frequency of interaction			-.08
Length of time horizon			-.31***
R ²	.10	.21	.22
Adjusted R ²	.06	.14	.12
F	2.42*	3.31**	3.13**

^a Entries represent standardized regression coefficients, $N = 111$.

† $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$

able investments occurs before an alliance is formed. Temporal consistency requires therefore that the perception of opportunistic behavior that shapes this risky decision must also be assessed for a point before the alliance is formed. Given this study's use of a previously developed measure (John, 1984) that focuses on postalliance behaviors, a strict test of Hypothesis 6 was not feasible. Instead, I assumed that for the 29 cases in which a prior collaborative history existed with the same partner, reported data on perceived opportunism were not significantly different from perceptions at alliance formation. Since the results for Hypotheses 4 and 6 are based not on the full set of firms ($N = 111$) but on a smaller subset ($N = 29$) with large within-sample variance, the findings should be regarded as tentative.

Finally, Hypothesis 7 was that the length of a time horizon and the extent of nonrecoverable investments would be positively related. Regression results showing a significant coefficient ($\beta = .33$, $p < .001$, adjusted $R^2 = .12$) strongly supported Hypothesis 7.

DISCUSSION, IMPLICATIONS, AND FUTURE DIRECTIONS

To a large degree, strategy research has been driven by the competitive, win-lose, zero-sum paradigm, as reflected by, for instance, Porter's (1980, 1985) influential work. The theoretical adequacy of this paradigm in studying today's complex organizational reality merits reevaluation, however. As the rapidly changing architecture of global business attests, firms increasingly engage in strategic alliances, which have at their core a set of issues—

such as mutual gain, interdependence, and vulnerability—distinctly different from those key to strictly competitive, zero-sum interfirm interactions. Indeed, the growing occurrence of potential opponents' nominal cooperation suggests greater emphasis on a subtler form of competition than the brazenly "red in the fang and claw" variety: interfirm cooperation in the pursuit of individual competitive advantage. It therefore seems imperative that strategy researchers pay keener attention to this phenomenon than heretofore and push to expand extant theory to include mixed-motive relations such as those characteristic of an infinitely repeated prisoner's dilemma game. Unfortunately, as Williamson (1985) noted, study of the institutions of contract and governance structures has occupied a low place on the research agenda, and consequently common incentive features incorporated in numerous types of alliances have gone undetected. The present study took a step toward addressing this gap by fusing the logics of nonzero-sum game theory and transaction cost economics. Together, these complementary perspectives reinforce each other and permit an excellent vehicle for focusing attention on the structural aspects of voluntary interfirm cooperation.

Research Contributions

The primary contributions of this research, then, are twofold: theoretical development of a model that eclectically blends important features of the transaction cost paradigm with game-theoretic insights, and derivation of empirical support for the model's predictions using data from actual partnerships. The results of this study lead to new insights into the structuring of alliances and suggest that interfirm cooperation is complex, embedded in various institutional arrangements, and at once forward-looking (linked to the shadow of the future) and backward-looking (linked to the cooperative history of the partners). Consistent with the logic shown in Figure 1, the findings show that structure is related to performance, that the perceived potential for opportunism influences both structure and performance, and that partners erect a variety of deterrent measures to stem possible losses from agreement violations.

The findings shown in Table 2 reveal partial support for the linkage between alliance structure and performance posited by recent advances in game theory. This support is particularly encouraging given that this is the first large-scale empirical study of the structuring of interfirm strategic alliances, and it suggests that stable, high-performing alliances can be differentiated from unstable, low performers on the basis of structural properties. More broadly, it points to promising research on the formation, maintenance, and dissolution of alliances using this study's general analytical framework, within which comparative differences among specific alliance types can be effectively evaluated. Normatively, this support suggests that *ex ante* managerial appreciation of the important role of game-theoretic structural dimensions may help arrest involuntary, untimely terminations and contribute to heightened performance levels.

However, the strength of the support across structural dimensions was

mixed. The hypothesis that payoffs will be significantly related to performance found very marginal support. One possible explanation for the finding is that in certain cases reputation effects (Kreps, 1990) may significantly moderate the hypothesized effects of payoffs. Unlike the fictitious prisoners in a one-shot prisoner's dilemma, alliance partners know that they may deal with each other again in the future or, at a minimum, that the cumulative effects of their past behaviors help build a reputation that influences their interactions with many constituencies within their broad environment. These reputation effects have information content that can attenuate or intensify fear of opportunism, modifying firm behaviors. Kreps, Milgrom, Roberts, and Wilson (1982) showed that reputation effects can rationally generate cooperative outcomes even in a finitely repeated prisoner's dilemma game. Thus, a firm's actions may be based on its partner's reputation and concern for its own reputation, as well as on the payoff structure, with the various influences combined in ways that are poorly understood. A reputation for never being first to defect (Axelrod, 1984) may substitute for a long and successful cooperative history, so that, for example, stable cooperation may be sustained even if the difference between payoffs from cheating and cooperation is large. However, management researchers have seldom empirically examined the important role of a firm's reputation, much less examined it in the context of interfirm cooperation. The findings suggest that future studies should investigate the process by which, and extent to which, good reputations enhance and questionable reputations hamper the emergence and maintenance of a firm's cooperative relationships with other firms.

A complementary explanation for the modest test results may be that the innovative payoff measure used in this research may also have been overly simplistic in its attempt to capture gains and losses under separate behavioral combinations. Specifically, the findings point to the need for more complex studies that explicitly capture (1) short-term payoffs from various types of agreement violation, since a self-enforcing agreement would terminate upon violation by either or both parties (Telser, 1980), and (2) long-term payoffs from mutual cooperation, discounted to the present using Axelrod's (1984) discount parameter, w .

The findings showing strong support for the shadow of the future hypothesis add to an understanding of how specific structural elements may help build superior alliance performance levels, by suggesting that high behavioral transparency, long time horizons, and frequent interactions promote reciprocal cooperation. Management can influence each of these elements, and each merits attention during both the design and implementation of an alliance. For example, the establishment of structured mechanisms that provide real-time information and accurate feedback regarding each other's actions, including effective recognition, verification, and signaling systems between partners, will minimize misperceptions, enhance behavioral transparency, and strengthen cooperation. Child (1987) and Byrne (1993) recognized this mutuality between information technology and organizational

design, arguing that the reliable, prompt, and relatively low-cost information made possible by information technology can enhance performance in a wide variety of contractual relations.

Concatenation of the positive findings on perceived opportunism, cooperative history, and ex ante and ex post deterrents (Hypotheses 3–10) evokes an interesting portrayal of the alliancing process. It suggests that at the beginning of a cooperative relationship, when little shared history exists between alliance partners, the lack of ex ante transparency of opportunistic inclinations leads to low trust levels and high mutual fear of opportunism (Hypothesis 4). This environment demands a firm to make a show of good faith as an inducement to the other side to participate and thereby generate for itself expected positive rewards from the alliance; in other words, it requires measures that diminish the firm's gains from exploitation, increase the costs of breaching the cooperative agreement, and thus reduce each party's fear of the other's opportunism (Hypotheses 5 and 9). Yet these same measures render both firms vulnerable (Hypothesis 6). The larger a firm's nonsalvageable costs, the greater the losses it incurs through its partner's unilateral repudiation of obligations.

There is thus an essential connection between the transaction cost notions of opportunism and asset specificity and game-theoretic notions of defection and sucker's payoff. This connection is at the root of Ouchi's (1980) fundamental problem of cooperation, referred to earlier, which integrates behavioral uncertainty with interdependence and vulnerability in the pursuit of self-gain through joint action: Without committed assets, a new, untested partner has no way of knowing the other's intentions, raising the prospects of short-term exploitation and agreement collapse. This risk of exposure to the other party's possible opportunistic withdrawal may be counterbalanced by both partners' commitment of nonrecoverable investments, which in turn alters the alliance structure and promotes goal congruence between partners.

Thus, successful interfirm cooperation may rest on two basic building blocks: (1) initiation of a mutually beneficial relationship, catalyzed by favorable calculations of discounted future payoffs from mutual cooperation and culminating in the commitment of some credible, significant nonrecoverable investments on both sides (Hypotheses 7 and 8) and (2) fading of the fear of opportunism as the partners build a cooperative history and fledgling mutual trust develops between them (Hypothesis 4). This process may gradually lead to a reduction in coordination efforts and compliance costs (Hypothesis 3) and a dynamically declining role for nonrecoverable investments and contractual safeguards as deterrents to opportunism (Hypothesis 10) as the partnership takes on more hierarchical and fewer market characteristics.

Indeed, the finding of support for the proposition that alliances buttressed by nonrecoverable investments are likely to be high performers (Hypothesis 8) could reflect the relative newness of many of the alliances studied. These youthful alliances must rely on a structured equilibrium, or a hard, formal, deterrent-dominated governance, since they have yet to evolve

a soft, informal, trust-dominated understanding between the partners. In the latter cases, the walls intended to guard against opportunism may gradually be lowered, reducing transaction costs and improving the efficiency (Buckley & Casson, 1988) of the cooperative relationship (Hypothesis 3).⁹

Limitations and Avenues for Future Research

Future research could extend or modify this study along several dimensions. For example, although the infinitely repeated prisoner's dilemma framework has proven extremely valuable in modeling incentives and motivations in economic situations (cf. Kreps, 1991) and has been used effectively in several empirical studies (e.g., Heide & Meiner, 1992), at least three research opportunities to extend the framework exist. Two of these were cited above: Casting a wider net around the phenomenon of cooperation by incorporating the impact of reputation effects on alliance-structuring decisions, and development of a more sophisticated payoff measure that taps calculations of discounted present value of anticipated future income streams from mutual cooperation.

Further, the framework is insufficiently elastic to adapt to changes in alliance partners' internal and external environments. As noted earlier, dynamic environmental shifts may change prisoner's dilemma to a different class of games that may be more conflictual (Deadlock) or less conflictual (Stag Hunt), affecting the robustness of cooperation. Moreover, contradicting Williamson's (1985) view of opportunism as self-interest-seeking with guile, Macneil (1981) showed that alliances may break down with or without guileful behavior, if changed circumstances make the initial terms untenable for either firm. Thus, the theoretical usefulness of the prisoner's dilemma framework can be enhanced by explicitly linking alliance dynamics to environmental changes.

Several methodological refinements to this study are also needed and possible, beginning with the last point. Despite its inclusion of cooperative history as a variable, this study's model essentially provides a cross-sectional snapshot. It therefore ignores environmental dynamism and its impact on alliance structuring, performance, and longevity. Also, choosing the study's starting and ending points arbitrarily creates the problem known as censoring, and furthermore, the time span 1983–88 is relatively short and therefore a poor substitute for a longitudinal life-cycle examination of alliance structuring. Future studies should incorporate the dynamic changes in ex ante and ex post deterrents occasioned by an evolving history and diminishing perception of opportunistic behavior through systematically repli-

⁹ Thus, a study focusing on older alliances might use a theoretical counterargument to reverse Hypothesis 8: That nonrecoverable investments should be negatively related to alliance performance, not only because a show of good faith is less requisite in established, mature relationships, but also because nonrecoverable investments erode strategic ability (Bresser & Harl, 1986) to redeploy those resources toward alternative uses at points of highest return.

cated case studies (Parkhe, 1993a) or through a cross-sectional, time-series research design.

Finally, although the analyses in this research generally confirmed the hypotheses tested, and thus may provide a good starting point, there is definite conceptual and practical merit in moving toward testing more complex theories involving unanswered, deeper questions about causality. Does trust lead to cooperation or vice versa? Does a long shadow of the future result in high performance, or does high performance result in a lengthening shadow of the future? The few studies attempting disentanglement of causal direction and feedback loops offer mixed views. For example, Anderson and Narus (1990) obtained a better explanation of construct covariances through a respecification of their model, in which cooperation was causally antecedent, rather than consequent, to trust. Conversely, Smith and Aldrich suggested that "perhaps the development of a trusting relation actually precedes substantial investments in specific assets, or perhaps asset specificity and trust are inextricably bound up in a reciprocal relationship" (1991: 31). Future research could significantly raise the level of theory development in alliance structuring by going beyond correlational analyses to path analysis and causal modeling that may permit a deeper understanding of the causal structure of relationships among crucial variables in interfirm cooperation.

REFERENCES

- Anderson, E. 1990. Two firms, one frontier: On assessing joint venture performance. *Sloan Management Review*, 31(2): 19-30.
- Anderson, E., & Weitz, B. 1989. Determinants of continuity in conventional industrial channel dyads. *Marketing Science*, 8: 310-323.
- Anderson, J. C., & Narus, J. A. 1990. A model of distributor firm and manufacturer firm working partnerships. *Journal of Marketing*, 54 (April): 42-58.
- Axelrod, R. 1984. *The evolution of cooperation*. New York: Basic Books.
- Axelrod, R., & Keohane, R. O. 1986. Achieving cooperation under anarchy: Strategies and institutions. In K. A. Oye (Ed.), *Cooperation under anarchy*: 226-254. Princeton, NJ: Princeton University Press.
- Barney, J. B. 1990. The debate between traditional management theory and organizational economics: Substantive differences or intergroup conflict? *Academy of Management Review*, 15: 382-393.
- Bendor, J., Kramer, R. M., & Stout, S. 1991. When in doubt . . . : Cooperation in a noisy prisoner's dilemma. *Journal of Conflict Resolution*, 35: 691-719.
- Borys, B., & Jemison, D. B. 1989. Hybrid arrangements as strategic alliances: Theoretical issues in organizational combinations. *Academy of Management Review*, 14: 234-249.
- Bresser, R. K., & Harl, J. E. 1986. Collective strategy: Vice or virtue? *Academy of Management Review*, 11: 408-427.
- Bromiley, P., & Cummings, L. L. 1991. *Transactions costs in organizations with trust*. Working paper, University of Minnesota at Minneapolis.
- Buckley, P., & Casson, M. 1988. A theory of cooperation in international business. In F. J. Contractor & P. Lorange (Eds.), *Cooperative strategies in international business*: 31-54. Lexington, MA: Lexington Books.

- Business Week**. 1986. Odd couples. July 21: 100-106.
- Byrne, J. A. 1993. The virtual corporation. **Business Week**, February 8: 98-103.
- Campbell, A. J. 1992. *Cooperative behavior in international vertical markets: Buyer-seller relations under conditions of heightened uncertainty*. Unpublished doctoral dissertation, University of Toronto.
- Campbell, D. T., & Fiske, D. W. 1959. Convergent and discriminant validation by the multitrait-multimethod matrix. **Psychological Bulletin**, 56: 81-105.
- Chen, M.-J., & Macmillan, I. C. 1992. Nonresponse and delayed response to competitive moves: The roles of competitor dependence and action irreversibility. **Academy of Management Journal**, 35: 539-570.
- Child, J. 1987. Information technology, organization, and the responses to strategic challenges. **California Management Review**, 30(1): 33-50.
- Churchill, G. 1979. A paradigm for developing better measures of marketing constructs. **Journal of Marketing Research**, 16: 64-73.
- Coase, R. 1937. The nature of the firm. **Economica**, 4: 386-405.
- Contractor, F. J., & Lorange, P. 1988. Why should firms cooperate? In F. J. Contractor & P. Lorange (Eds.), *Cooperative strategies in international business*: 3-28. Lexington, MA: Lexington Books.
- Cook, T. D., & Campbell, D. T. 1979. *Quasi-experimentation: Design and analysis issues for field settings*. Chicago: Rand McNally.
- Deutsch, M. 1973. *The resolution of conflict*. New Haven, CT: Yale University Press.
- Dilman, D. A. 1978. *Mail and telephone surveys: The total design method*. New York: Wiley.
- Dwyer, F. R., Schurr, P. H., & Oh, S. 1987. Developing buyer-seller relationships. **Journal of Marketing**, 51 (April): 11-27.
- Freeman, R. E. 1987. Review of *The Economic Institutions of Capitalism*, by O. E. Williamson. **Academy of Management Review**, 12: 385-387.
- Galanter, M. 1981. Justice in many rooms: Courts, private ordering, and indigenous law. **Journal of Legal Pluralism**, 19: 1-47.
- Gambetta, D. 1988. *Trust: Making and breaking cooperative relations*. New York: Basil Blackwell.
- Gauss, C. 1952. Introduction. In N. Machiavelli, *The prince*: 7-32. New York: New American Library.
- Geringer, J. M., & Hebert, L. 1991. Measuring performance of international joint ventures. **Journal of International Business Studies**, 22: 249-264.
- Granovetter, M. 1985. Economic action and social structure: A theory of embeddedness. **American Journal of Sociology**, 91: 481-510.
- Gray, B. 1989. *Collaborating*. San Francisco: Jossey-Bass.
- Greene, C. N., & Organ, D. W. 1973. An evaluation of causal models linking the received roles with job satisfaction. **Administrative Science Quarterly**, 18: 95-103.
- Gupta, A. K., & Singh, H. 1990. *Exploiting synergies: External alliances vs. inter-SBU coordination*. Paper presented at the annual meeting of the Strategic Management Society, Stockholm.
- Harman, H. H. 1967. *Modern factor analysis*. Chicago: University of Chicago Press.

- Harrigan, K. R. 1987. Strategic alliances: Their new role in global competition. *Columbia Journal of World Business*, 22(2): 67–69.
- Heide, J. B., & John, G. 1988. The role of dependence balancing in safeguarding transaction-specific assets in conventional channels. *Journal of Marketing*, 52 (January): 20–35.
- Heide, J. B., & Miner, A. S. 1992. The shadow of the future: Effects of anticipated interaction and frequency of contact on buyer-seller cooperation. *Academy of Management Journal*, 35: 265–291.
- Hennart, J. F. 1991. The transaction costs theory of joint ventures. *Management Science*, 37: 483–497.
- Hergert, M., & Morris, D. 1988. Trends in international collaborative agreements. In F. Contractor & P. Lorange (Eds.), *Cooperative strategies in international business*: 99–109. Lexington, MA: Lexington Books.
- Hill, C. W. L. 1990. Cooperation, opportunism, and the invisible hand: Implications for transaction cost theory. *Academy of Management Review*, 15: 500–513.
- Hill, C. W. L., Hitt, M. A., & Hoskisson, R. 1992. Cooperative versus competitive structures in related and unrelated diversified firms. *Organization Science*, 3: 501–521.
- Hitt, M. A., Hoskisson, R. E., Ireland, R. D., & Harrison, J. S. 1991. Effects of acquisitions on R&D inputs and outputs. *Academy of Management Journal*, 34: 693–706.
- Hladik, K. J. 1985. *International joint ventures*. Lexington, MA: Lexington Books.
- Huber, G. P., & Power, D. J. 1985. Retrospective reports of strategic level managers: Guidelines for increasing their accuracy. *Strategic Management Journal*, 6: 171–180.
- John, G. 1984. An empirical investigation of some antecedents of opportunism in a marketing channel. *Journal of Marketing Research*, 21: 278–289.
- Keats, B. W., & Hitt, M. A. 1988. A causal model of linkages among environmental dimensions, macro organizational characteristics, and performance. *Academy of Management Journal*, 31: 570–598.
- Knight, F. H. 1965. *Risk, uncertainty and profit*. New York: Harper & Row.
- Kogut, B. 1989. The stability of joint ventures: Reciprocity and competitive rivalry. *Journal of Industrial Economics*, 38: 183–198.
- Kreps, D. M. 1990. Corporate culture and economic theory. In J. E. Alt & K. A. Shepsle (Eds.), *Perspectives on positive political economy*: 90–143. Cambridge: Cambridge University Press.
- Kreps, D. M. 1991. *Game theory and economic modeling*. Oxford: Clarendon Press.
- Kreps, D. M., Milgrom, P., Roberts, J., & Wilson, R. 1982. Rational cooperation in the finitely repeated prisoner's dilemma. *Journal of Economic Theory*, 27: 245–252.
- Lincoln, J. R., & Zeitz, G. 1980. Organizational properties from aggregated data: Separating individual and structural effects. *American Sociological Review*, 45: 391–408.
- MacKenzie, S. B., Podsakoff, P. M., & Fetter, R. 1991. Organizational citizenship behavior and objective productivity as determinants of managerial evaluations of salespersons' performance. *Organizational Behavior and Human Decision Processes*, 50: 123–158.
- Macneil, I. R. 1978. Contracts: Adjustment of long-term economic relations under classical, neoclassical, and relational contract law. *Northwestern University Law Review*, 72: 854–902.
- Macneil, I. R. 1981. Economic analysis of contractual relations: Its shortfalls and the need for a "rich classificatory apparatus." *Northwestern University Law Review*, 75: 1018–1063.

- Michel, J. G., & Hambrick, D. C. 1992. Diversification posture and top management team characteristics. *Academy of Management Journal*, 35: 9-37.
- Narasimhan, S. 1989. Relationship or boundary? Handling successive contracts. *California Law Review*, 77: 1077-1122.
- Nunnally, J. 1978. *Psychometric theory*. New York: McGraw-Hill.
- Oliver, C. 1990. Determinants of interorganizational relationships: Integration and future directions. *Academy of Management Review*, 15: 241-265.
- Osborn, R. N., & Baughn, C. C. 1990. Forms of interorganizational governance for multinational alliances. *Academy of Management Journal*, 33: 503-519.
- Ouchi, W. G. 1980. Markets, bureaucracies, and clans. *Administrative Science Quarterly*, 25: 129-142.
- Oye, K. A. (Ed.). 1986. *Cooperation under anarchy*. Princeton, NJ: Princeton University Press.
- Parkhe, A. 1991. Interfirm diversity, organizational learning, and longevity in global strategic alliances. *Journal of International Business Studies*, 22: 579-601.
- Parkhe, A. 1993a. "Messy" research, methodological predispositions, and theory development in international joint ventures. *Academy of Management Review*, 18: 227-268.
- Parkhe, A. 1993b. Partner nationality and the structure-performance relationship in strategic alliances. *Organization Science*, 4: 301-324.
- Peter, J. P. 1979. Reliability: A review of psychometric basics and recent marketing practices. *Journal of Marketing Research*, 16: 6-17.
- Pfeffer, J., & Salancik, G. 1978. *The external control of organizations: A resource dependence perspective*. New York: Harper & Row.
- Podsakoff, P. M., MacKenzie, S. B., Moorman, R. N., & Fetter, R. 1990. Transformational leader behaviors and their effects on followers' trust in leader, satisfaction, and organizational citizenship behaviors. *Leadership Quarterly*, 1(2): 107-142.
- Podsakoff, P. M., & Organ, D. W. 1986. Self-reports in organizational research: Problems and prospects. *Journal of Management*, 12: 531-544.
- Podsakoff, P. M., Todor, W. D., Grover, R. A., & Huber, V. 1984. Situational moderators of leader reward and punishment behaviors: Fact or fiction? *Organizational Behavior and Human Performance*, 34: 21-63.
- Porter, M. E. 1980. *Competitive strategy*. New York: Free Press.
- Porter, M. E. 1985. *Competitive advantage*. New York: Free Press.
- Porter, M. E., & Fuller, M. B. 1986. Coalitions and global strategy. In M. E. Porter (Ed.), *Competition in global industries*: 315-344. Boston, MA: Harvard Business School Press.
- Powell, W. W. 1990. Neither market nor hierarchy: Network forms of organization. *Research in Organizational Behavior*, 12: 295-336.
- Practicing Law Institute. 1986. *Corporate partnering: Advantages for emerging and established companies*. New York: Practicing Law Institute.
- Provan, K. G., & Skinner, S. J. 1989. Interorganizational dependence and control predictors of opportunism in dealer-supplier relations. *Academy of Management Journal*, 32: 202-212.
- Rapoport, A. 1961. *Fights, games, and debates*. Ann Arbor: University of Michigan Press.
- Rapoport, A., & Chammah, A. 1965. *Prisoner's dilemma*. Ann Arbor: University of Michigan Press.
- Reich, R. B., & Mankin, E. D. 1986. Joint ventures with Japan give away our future. *Harvard Business Review*, 64(2): 78-86.

- Rempel, J. K., Holmes, J. G. & Zanna, M. P. 1985. Trust in close relationships. *Journal of Personality and Social Psychology*, 49: 95–112.
- Ring, D. S., & Van de Ven, A. H. 1992. Structuring cooperative relationships between organizations. *Strategic Management Journal*, 13: 483–498.
- Salancik, G. R., & Pfeffer, J. 1977. An examination of need-satisfaction models of job attitudes. *Administrative Science Quarterly*, 22: 427–456.
- Schelling, T. C. 1960. *The strategy of conflict*. Cambridge, MA: Harvard University Press.
- Seabright, M. A., Levinthal, D. A., & Fichman, M. 1992. Role of individual attachments in the dissolution of interorganizational relationships. *Academy of Management Journal*, 35: 122–160.
- Shubik, M. 1975. *Games for society, business, and war: Toward a theory of gaming*. New York: Elsevier.
- Smith, A., & Aldrich, H. E. 1991. *The role of trust in the transaction cost economics framework*. Paper presented at the annual meeting of the Academy of Management, Miami.
- Spence, M. 1978. Tacit coordination and imperfect information. *Canadian Journal of Economics*, 13: 490–505.
- SPSS. 1988. *SPSS-X user's guide*. Chicago: SPSS.
- Teece, D. 1986. Profiting from technological innovation. *Research Policy*, 15: 285–305.
- Telser, L. G. 1980. A theory of self-enforcing agreements. *Journal of Business*, 53: 27–41.
- Thorelli, H. 1986. Networks: Between markets and hierarchies. *Strategic Management Journal*, 7: 37–51.
- Venkatraman, N., & Ramanujam, V. 1986. Measurement of business performance in strategy research: A comparison of approaches. *Academy of Management Review*, 11: 801–814.
- Williamson, O. E. 1983. Credible commitments: Using hostages to support exchange. *American Economic Review*, 73: 519–540.
- Williamson, O. E. 1985. *The economic institutions of capitalism*. New York: Free Press.
- Williamson, O. E., & Ouchi, W. G. 1981. The markets and hierarchies program of research: Origins, implications, prospects. In A. Van de Ven & W. F. Joyce (Eds.), *Perspectives on organization design and behavior*: 347–370. New York: Wiley.

APPENDIX

Definition of Measures

Item texts are in quotation marks.

Performance

Strategic needs (16 items, $\alpha = .79$). "Firms enter into strategic alliances to fulfill a variety of needs. Was each need listed below Not Important, Somewhat Important, or Very Important in your firm's decision to enter into this strategic alliance?" Examples include the need to co-opt or block competition, through a "defensive strategic alliance to reduce competition," or an "aggressive strategic alliance to increase costs or to lower market share for a third company" (3 = very important, 2 = somewhat important, 1 = not important). Fulfillment of needs was measured on a five-point scale: 5 = very well, 4 = well, 3 = average, 2 = poorly, 1 = very poorly.

Indirect performance indicators (3 items, $\alpha = .87$). (1) Spillover effects. "Many alliances result in 'spillover' effects for their parent firms. For example, positive spillover effects may occur when knowhow that is gained from alliance activities can be applied profitably to non-alliance operations as well. Negative spillover effects may occur from competition between the

alliance and other parent firm operations, such as when geographical markets overlap. In the present alliance, are the net spillover effects for your firm?" (5 = strongly positive, 1 = strongly negative). (2) Relative profitability. "Using the most significant indicator of profitability in the context of this alliance (such as return on investment, return on sales, or return on equity), the profitability of your alliance relative to the profitability of the industry of which the alliance is a part would be:" (5 = far lower, 1 = far greater; reverse-scored). (3) Overall performance assessment. "In your overall assessment, how has the alliance performed as compared to your expectations?" (5 = very well, 1 = very poorly).

Perception of Opportunistic Behavior (6 items, $\alpha = .88$)

"As you know, cooperative relationships are sometimes subject to 'opportunistic' behavior. That is, one firm may not abide by the terms of the agreement in order to exploit the other for short-term gain. Examples of opportunistic behavior are withholding or distorting information, shirking or failing to fulfill promises or obligations, appropriation of the partner firm's technology or key personnel, late payments, and delivery of substandard products. With respect to your partner firm in the present alliance: (1) they have always provided us a completely truthful picture of their business [reverse-scored]; (2) complete honesty does not pay when dealing with my partner; (3) sometimes my partner alters the facts slightly in order to get what they need; (4) my partner carries out their duties even if we do not check up on them [reverse-scored]; (5) my partner has sometimes promised to do things without actually doing them later; (6) they seem to feel that it is OK to do anything within their means that will help further their firm's interests" (1 = strongly disagree, 5 = strongly agree).

Structure

Shadow of the Future

Behavioral transparency (3 items; $\alpha = .81$). (1) "After how much time does your firm typically learn about changes in your partner firm's behavior (such as compliance or non-compliance with the agreement) related to your firm and the alliance?" (1 = within 1 day, 4 = over 1 month; reverse-scored); (2) "Usually, what is your source of such information?" (1 = partner firm, 2 = alliance itself, 3 = own firm's employees); (3) "How often is this information accurate?" (1 = never, 2 = seldom, 3 = usually, 4 = always).

Frequency of interaction (2 items, interitem correlation = .87). (1) "How many times do senior executives from your firm and the partner firm typically meet per year?" (2) "At lower levels (for example, R&D at one firm, Manufacturing at another), how frequently does communication take place (by any means)?" (1 = never, 4 = frequently).

Time horizon (2 items, interitem correlation = .64). (1) *Intended duration*. "Some alliances are envisioned to last an indefinite period of time, while others are created explicitly with short-term goals in mind, such as fadeout agreements. At the time it was launched, what was the intended duration of this alliance?" (1 = short term, 1–3 years; 3 = long term, over 5 years); (2) *Perceived likelihood*. "In your estimation, what is the likelihood that the alliance will actually last for the intended duration?" (1 = low, 5 = high).

Pattern of Payoffs

"Please provide a quantitative assessment of the impact of four different behavior patterns, as pictured below. In this question, 'cooperative behavior' means full cooperation in the letter and spirit of the agreement, and 'opportunistic behavior' means one firm acting to maximize its gains, even if this involves heavy losses for the partner and a breakup of the alliance. If your firm's payoff from Scenario II is assumed to be \$1.00, what would be the relative payoff in Scenarios I, III, and IV?

"Note: Even if you are not sure of the answers, please give us your best estimates."

Respondents received a four-cell matrix containing the following four scenarios: (I) "A opportunistic [firm A was identified as the respondent's company], B cooperative. Payoff to Firm A would be ____"; (II) "A and B both cooperative. Payoff to Firm A = \$1.00"; (III) "A and

B both opportunistic. Payoff to Firm A would be ____"; (IV) "A cooperative, B opportunistic. Payoff to Firm A would be ____."

Ex Ante Deterrents

"If this alliance were to dissolve, your firm's non-recoverable investments in cash and kind (technology, physical assets, knowhow, etc.) can be described as" (1 = negligible, 2 = moderate, 3 = substantial, 4 = heavy).

Ex Post Deterrents

"Which safeguards listed below were put into the formal agreement of this alliance? (1) periodic written reports of all relevant transactions; (2) prompt written notice of any departures from the agreement; (3) the right to examine and audit all relevant records through a firm of CPAs; (4) designation of certain information as proprietary and subject to confidentiality provisions of the contract; (5) non-use of proprietary information even after termination of agreement; (6) termination of agreement; (7) arbitration clauses; (8) lawsuit provisions."

Cooperative History

"Has your firm been engaged with your partner firm in alliances other than the present one? (0 = no, 1 = yes). If YES: How many others? ____ alliances. For how many years? ____ Years."

Arvind Parkhe is an assistant professor in the Department of Management, Indiana University, Bloomington. He received his Ph.D. degree from Temple University in 1989. His research focuses on the use of inductive methods for studying trust, opportunism, and other "soft" phenomena in voluntary interfirm cooperation, robust structuring of cooperative agreements, and effective management of international business partnerships.

RESEARCH NOTES

© Academy of Management Journal
1993, Vol. 36, No. 4, 830-843.

EFFECTS OF ALTERNATE FAMILY STRUCTURES ON MANAGERIAL CAREER PATHS

JOY A. SCHNEER
Rider College

FRIEDA REITMAN
Pace University

The number of "traditional" families, those with an employed father and a not-employed mother, has been decreasing. This article presents an expanded typology of family structure that includes spousal employment status. The effects on managerial career paths of a "post-traditional" family structure, in which both parents are employed, is explored. The results from a survey of M.B.A. degree holders show such a family structure to be related to income and career satisfaction for men and women. The findings suggest that family structure should receive greater focus from both researchers and organizations.

This study examines the importance of family structure to the career paths of managers. There have been many changes in family structure in the United States over the last 20 years; particularly prominent has been an increase in the number of married women with children who are in the work force. The number of "traditional" families, those with an employed father and a not-employed mother, has declined. However, organizations and researchers have failed to adequately examine the implications of these changes for managerial careers.

These demographic changes in the work force are likely to affect the careers of men and women differently. Historically, most organizations have structured management career paths with the expectation that the jobs would "be filled by a family man who has a wife to manage the household, allowing his full attention to be given to the job" (Nieva, 1985: 175). Thus, men in "post-traditional" families, who have children and employed wives, may have problems succeeding within the organizational model designed for men in traditional families. They do not fit the stereotype of the "organization man" (Shepard, 1985; Whyte, 1956) able to devote all his energies to meeting great work demands.

By virtue of their gender, managerial women do not fit the traditional model of the successful manager. An earlier generation of managerial women assumed that they could not compete with men if they had family responsibilities that might divert their attention from work and therefore did not marry, or they married but had no children (Devanna, 1984; Hennig & Jardim, 1977). More recently, many managerial women have decided that

they do not want to sacrifice their personal lives for their careers and are trying to have both. The post-traditional family structure may well affect the careers of these women.

In this study, we analyzed data on a sample of managers to determine how the structure of their families was related to two elements of career paths: income and career satisfaction. Our research makes a unique contribution to the literature on careers and family structure by studying a specific cohort of men and women (M.B.A. degree holders) and using a typology that simultaneously focuses on three dimensions of family structure: marital status, parental status, and spousal employment status. Expecting the three dimensions of family structure to be inextricably interrelated, we departed from prior research in which each dimension has been treated as independent.

THEORETICAL FRAMEWORK AND HYPOTHESES

Family Structure Typology

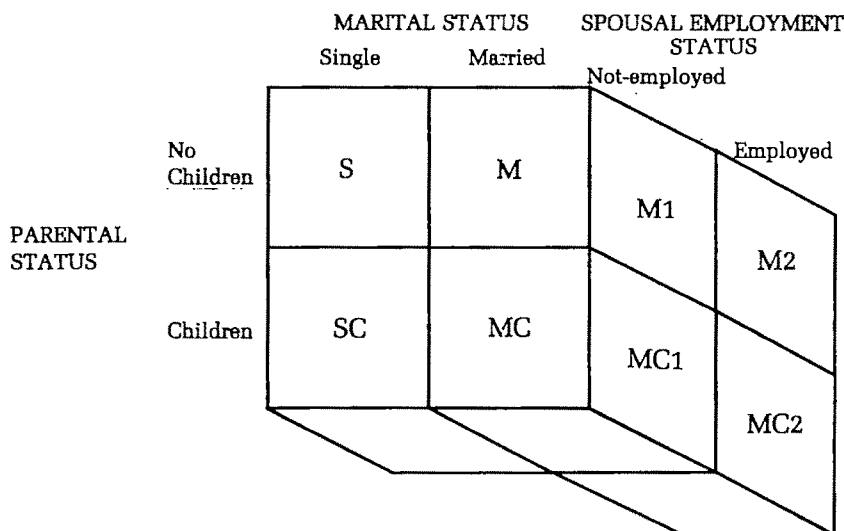
We propose expanding the family structure typology most commonly used in research. Researchers have offered a two-dimensional typology including only marital and parental status. This method results in three standard family structures: single (S), married with no children (M), and married with children (MC). Although these two dimensions generate a fourth category, single with children (SC), it has not been considered standard.

This typology was adequate when the married-with-children (MC) category represented primarily traditional families in which the man was employed and the woman stayed home with the children. However, family structure is more complex now. Women no longer automatically leave the work force when they have children. According to the U.S. Bureau of Labor Statistics, in 1960 only 39 percent of married women with children 6–17 years of age and 19 percent with children under age 6 were in the labor force. As of 1988 these percentages had increased to 73 and 57 percent, respectively (Bureau of Labor Statistics, 1989: 243). To reflect these changes, a third dimension should be added to the family structure typology: the employment status of the spouse (see Figure 1). In the new typology, the individual being described is employed and the employment status of the spouse is allowed to vary. Six family structures are generated:

- S = single, no children;
- M1 = married, no children, not-employed spouse (one income);
- M2 = married, no children, employed spouse (two incomes);
- SC = single, children;
- MC1 = married, children, not-employed spouse (one income);
- MC2 = married, children, employed spouse (two incomes).

Clearly, this typology can be extended to include additional marital status categories. For the sake of clarity in this first development of the model, we have not added divorced, separated, or widowed as marital statuses or a category for persons living with a significant other.

FIGURE 1
Family Structure Typology



Our new typology makes explicit family structures that were implicit. A single category for married people with children is no longer sufficient as the family structures are vastly different when both parents are employed (MC2) and when only one parent is employed (MC1). The increasing importance of this post-traditional family structure (MC2) is a phenomenon often overlooked.

Although we focused on the changes in the married-with-children category, we should note that the single and married categories are also changing. The age of first marriage has been increasing (*World Almanac and Book of Facts*, 1992), and many couples are postponing becoming parents or never becoming parents (Blau & Ferber, 1986). Thus, the traditional expectation that the single and the married-without-children categories are short stages leading to a long-term married-with-children stage needs to be revised.

Family Structure and Income

Although a number of studies have looked at some aspects of family structure as it relates to income, none have looked at all the dimensions (marital status, parental status, spousal employment status) and gender. Neither have the interactive effects of the dimensions been considered. Overall, studies have shown that married men earn more than single men (Korenman & Neumark, 1991), but married women do not have a marital bonus (Dolton & Makepeace, 1987; Hill, 1979; Talbert & Bose, 1977). Women with children tend to pay an income penalty (Hill, 1979), but men do not (Dolton &

Makepeace, 1987). Men with employed spouses earn less than men with not-employed spouses (Pfeffer & Ross, 1982), but women with employed spouses do not earn less than women with not-employed spouses (LeLouarn, Theriault, & Toulouse, 1984).

Although no theory focuses directly on family structure, theories from other areas can be called on to predict the effect of family structure on income. First we will apply these theoretical bases to incomes for men. Human capital theory (Blau & Ferber, 1986) suggests that those with a high investment in education and training as well as stability and responsibility receive organizational rewards. Marriage and children may stand as proxies for this investment (Pfeffer & Ross, 1982). A man's having an employed wife might imply less investment, responsibility, and stability than having a not-employed spouse because the demands and rewards of the wife's employment are seen as competing with those of the husband's. Therefore, men in post-traditional family structures (MC2) might earn less than men in traditional family structures (MC1). Single men would earn the least as they are perceived as making less investment in human capital than married men.

According to societal stereotypes theory (Russo, 1985), the ideal family structure is built around a married man with children: thus, men who are single or married without children do not meet expectations. Married men with children and employed wives also do not fit the societal model that expects men to be the breadwinners and women to stay home with children. If the successful managerial model is built around traditional family men, then men in any other family structure will be less rewarded financially by their organizations.

The third theory we drew on, spousal support, derives from the work of Kanter (1977). She suggested that wives contribute to their husbands' success by assuming the roles of work assistant, consultant, social director, public relations director, and counselor. Thus, married men would earn more than single men because they benefit from such spousal support. However, children might diminish the time wives have available to devote to their husbands' careers, and employed wives would certainly have less time and energy for their spouses.

All three theories and findings of prior research suggest that men in post-traditional families (MC2) will earn less than men in traditional families (MC1). The relationship between MC2 men and men in the other family structures is unclear as the different theories and the empirical data do not suggest a consistent pattern. We therefore hypothesized that

Hypothesis 1: For men, MC2 family structure will be associated with lower income than the MC1 family structure.

Applying the same theories to predict the impact of family structure on income for women produces different outcomes than for men. Since it is very unusual for a woman to have a not-employed spouse (M1 or MC1), we did not speculate on the impact of spousal employment status on income for

women. In human capital terms, both marriage and children usually signal diminished investment, work experience, and labor force attachment as women interrupt (or anticipate interrupting) their educations and careers for family responsibilities. In terms of societal stereotypes theory, the traditional view is that a wife should care for her husband and children. Those who have children and work (MC2) do not conform to societal expectations and thus will earn less than other women. The spousal support prediction, parallel to the interpretation for men we have offered, is that MC2 women will earn less than M2 women but more than single women.

Thus, two of the three theories suggest that MC2 women will receive less income than single women, and all three suggest that MC2 women will receive less income than M2 women. We therefore hypothesized that

Hypothesis 2: For women, MC2 family structure will be associated with lower income than the other family structures.

Family Structure and Career Satisfaction

Previous research did not provide us with either theoretical or empirical guidance for a hypothesis about the relationship of family structure to career satisfaction as this area has not been investigated. Our approach to the relationship derives from the traditional model of the successful organizational manager (Shepard, 1985) as a person who is willing and able to meet the demands of a managerial career including travel, relocation, and long work hours. This person typically would be an MC1 man who has a spouse who supports his career and attends to his personal needs, allowing him to focus his energies on work (Nieva, 1985). A man with such a family structure would be expected to be the most satisfied with his career. Post-traditional family structures would be the least likely of any of the structures we have identified to allow people to meet the ideal because of multiple alternate demands (children, spouses' careers), and thus, such individuals should be the least satisfied with their careers. Therefore,

Hypothesis 3: MC2 family structure will be associated with lower career satisfaction than the other family structures.

METHODS

The data were collected in conjunction with a larger study of M.B.A. career paths. A six-page survey was mailed to 1,361 randomly chosen men and women who had received their M.B.A. degrees between 1975 and 1980 from two large northeastern universities. The survey included questions about career path and family structure. The specific measures of interest in this study included employment status, income, career satisfaction, hours of work per week, years of work experience since receiving the M.B.A., field of responsibility, employment gap (period not employed), marital status, pa-

rental status, age, and spouse's employment status. Income was measured as reported yearly salary plus bonus. Career satisfaction was computed as the average satisfaction with eight career criteria—salary, title, autonomy, responsibility, job security, skill enhancement, skill use, and opportunity for advancement—measured on a five-point Likert scale, with high ratings indicating higher satisfaction. The internal consistency reliability for the scale was adequate ($\alpha = .87$). Employment gap and family structure were dummy-coded (1 = gap, 0 = no gap; 1 = respondent is in this family structure, 0 = otherwise). Gender was coded as 1 for woman and 0 for man. Hours of work per week was measured as the number of hours worked each week, including hours at work and job-related hours outside the office. In-depth telephone interviews supported the validity of the measures. We asked respondents a number of questions that had been on the written instrument (number of children, years of work experience, year of graduation), and the correlations between the oral and written data were strong (r 's $> .95$).

The response rate was 68 percent, with 925 individuals returning completed questionnaires. Examination of the respondents and nonrespondents suggested that there was no nonresponse bias as there were no significant differences in gender ($\chi^2 = .03$), geographic location ($\chi^2 = 1.83$), or age ($t = 1.78$). We had to exclude 41 of the respondents because they actually had graduated after 1980. The sample was approximately evenly divided between men and women. The average age of the respondents was 38 years. The analyses were conducted on the 695 respondents who were employed full-time and were either single or married (women = 269, men = 426). This subsample was used to provide a clear test of the hypotheses. It should be noted that this procedure led to the exclusion of more women than men, as 23 percent of the women were not employed full-time, versus only 2 percent of the men.

As expected, certain family structures are not well represented in this sample. Fewer than 1 percent of the men or women were single with a child (SC) or married without children and with a spouse who was not employed (M1). Few women were in the MC1 category (1%), suggesting that this family arrangement (an employed wife and a househusband) is still relatively rare. Overall, this data set confirms that the family structure of current managers working full-time is different from what would have been expected in previous decades. Although the majority of managerial men were married with children (72%), the primary structure was not the traditional family. One-third of the men were in traditional families (MC1), but more than a third (39%) were in post-traditional families (MC2). The percentages of men who were single (S) or married without children and with an employed spouse (M2) were fairly low (14% and 13%, respectively). Although the predominant structure for managerial women was also MC2 (45%), large percentages of women were in the S (29%) or M2 (23%) categories. Clearly, women M.B.A. degree holders in traditional families are not included in this description of respondents working full-time. Of the 422 women in the total

sample, fewer than 10 percent were in families in which their husbands were employed but they were not.

RESULTS

Table 1 shows the correlation matrix and descriptive statistics for the independent and dependent variables. Table 2 presents the mean income and career satisfaction for each of the family structures for the total sample and for men and women separately. For men, the mean incomes significantly differ by family structure ($F = 13.9$, $p < .001$). The means suggest support for the first hypothesis, as MC2 men earn 19 percent less than MC1 men. The income means for women and the career satisfaction means for both men and women do not vary significantly by family structure.

Table 3 presents results of the test of the income hypotheses. We conducted multiple regression analyses to examine the relationship between family structure and income. Family structure was coded as three dummy variables (S, M2, MC1), with MC2 selected as the omitted family structure since its omission provided a direct test of our hypotheses, allowing each of the three other family structures to be compared to it.¹ We included five control variables that influence income (Madden, 1987; Olson & Frieze, 1987; Reitman, 1985; Schneer & Reitman, 1990). The different income hypotheses for men and women suggested computing separate equations by gender. The first column in Table 3 thus presents the income regression equation for the men. Results of the model are statistically significant, with 33 percent of the variance in income accounted for. The regression coefficients show that, all other things being equal, (1) each additional hour worked per week added \$1,230 to income, (2) having a discontinuous employment history reduced income by \$12,630, and (3) being a member of a MC1 family added \$12,770 to income. This pattern translates into MC1 men earning 20 percent more than MC2 men after age, hours, experience, employment gap, and field of responsibility are controlled. The regression coefficients for the other family structures are not significantly different from zero. These findings support Hypothesis 1, as the MC2 family structure is associated with less income than the MC1 family structure.

The second set of columns presents results of the income regression analysis for women. Findings are again statistically significant, with 31 percent of the variance in income accounted for. The regression coefficients show that, all things being equal, (1) each additional hour worked per week added \$1,080 to income, (2) having a discontinuous employment history subtracted \$6,400 from income, (3) each year of post-M.B.A. work experience added \$2,610 to income, and (4) being single diminished income by

¹ For the income and career satisfaction regression equations, we omitted the small number of M1 and SC respondents ($N = 10$) to allow for clear comparisons to those in the MC2 category, the omitted dummy variable.

TABLE 1
Pearson Correlations and Descriptive Statistics^a

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9	10
1. Income ^b	63.76	26.61										
2. Satisfaction	3.64	0.74	.38									
3. Hours	48.99	8.66	.45	.24								
4. Age	37.70	5.96	.05	-.02	.03							
5. Employment gap	0.21	0.41	-.26	-.18	-.13	-.04						
6. Experience	8.33	1.77	.23	.07	.11	.17	-.18					
7. S ^c	0.20	0.40	-.15	-.05	.04	-.13	.12	-.13				
8. M2 ^c	0.17	0.37	-.01	.00	.02	-.20	-.06	-.03	-.22			
9. MC2 ^c	0.41	0.49	-.09	.03	-.12	.27	.06	.04	-.41	-.38		
10. MC1 ^c	0.21	0.41	.28	.03	.09	-.01	-.12	.11	-.25	-.23	-.43	
11. Gender	0.39	0.49	-.22	.01	-.09	-.01	.14	-.15	.19	.13	.05	-.38

^a N = 695. Correlation coefficients greater than .09 are significant at $p < .01$.

^b Income was measured in thousands of dollars.

^c Family structures are as follows: S = single; M2 = married, no children, employed spouse; MC2 = married, children, employed spouse; and MC1 = married, childless, not-employed spouse.

TABLE 2
Comparison of Means by Family Structure^a

Variables	S		M2		MC2		MC1	
	Means	s.d.	Means	s.d.	Means	s.d.	Means	s.d.
Income								
Total	55.53	23.78	63.00	25.38	60.79	23.99	78.33	29.02
Men	56.07	23.72	65.19	26.39	64.15	23.46	79.07	29.08
Women	55.13	23.98	61.11	24.51	56.03	24.04	52.50	5.00
Career satisfaction								
Total	3.56	0.82	3.64	0.72	3.66	0.68	3.68	0.77
Men	3.46	0.86	3.65	0.74	3.65	0.71	3.68	0.77
Women	3.64	0.79	3.64	0.71	3.69	0.63	3.44	0.53

^a Family structures are as follows: S = single; M2 = married, no children, employed spouse; MC2 = married, children, employed spouse; and MC1 = married, children, not-employed spouse.

TABLE 3
Results of Regression Analysis for Income

Variables	Men		Women	
	<i>b</i>	s.e.	<i>b</i>	s.e.
Intercept	-7.77	11.98	-14.15	12.68
Age	0.11	0.21	-0.01	0.23
Hours	1.23***	0.14	1.08***	0.15
Gap	-12.63***	3.13	-6.40*	3.03
Experience	1.04	0.65	2.61**	0.83
Accounting	-3.03	4.04	-2.71	3.99
Management	6.08	4.33	6.85	4.61
Engineering	-8.62†	4.65	2.62	6.11
Finance	3.72	4.26	7.15	4.72
Marketing	3.45	4.40	4.40	4.33
S	-1.95	3.72	-6.68*	3.20
M2	0.21	3.75	0.70	3.45
MC1	12.77***	2.66	-12.12	10.56
F	16.55***		9.16***	
R ²	.33		.31	

† $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$

\$6,680. This translates into single women earning approximately 12 percent less than MC2 women after age, hours, experience, employment gap, and field of responsibility were controlled. The coefficients for M2 and MC1 are not statistically significant. These findings do not support Hypothesis 2, which predicts that all three family structures will be associated with more income than MC2.

TABLE 4
Results of Regression Analysis for Career Satisfaction

Variables ^a	<i>b</i>	s.e.
Intercept	3.33***	.20
Age	-0.01†	.00
Income	0.01***	.00
Gap	-0.19**	.07
Gender	0.14*	.06
S	-0.07	.07
M2	-0.11	.08
MC1	-0.16*	.07
F	19.89***	
R ²	.17	

^a S = single; M2 = married, no children, employed spouse; and MC1 = married, children, not-employed spouse.

† $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$

Table 4 shows the results for the career satisfaction regression equation. We included four control variables in the equation because of their expected impact on career satisfaction (Reitman, 1985; Schneer & Reitman, 1990). Preliminary analyses included interactions of family structure and gender, but they were not significant, and thus, we present a single model for the total sample. Results of the model are statistically significant, with 17 percent of the variance in career satisfaction accounted for. The regression coefficients indicate a statistically significant relationship between career satisfaction and the independent variables of income, employment gap, and gender. Of the family structure variables, only MC1 significantly contributed to the regression model ($F = 4.6, p < .05$). Hypothesis 3 is not supported; the findings suggest that those in MC2 family structures are more satisfied with their careers than those in MC1 family structures and are at least as satisfied as those in other family structures.

DISCUSSION

This study advances research on the career implications of family structure by examining three dimensions simultaneously through an expanded typology. It also adds to existing research by including effects on both income and career satisfaction, by analyzing data on both men and women, and by focusing on a homogeneous cohort. The findings support Hypothesis 1, predicting that post-traditional family men, those with children and employed wives, will earn less than traditional family men, whose wives are not employed. It is difficult to determine which theory accounts for the income finding, since all three predicted this outcome. This consistency stems, in our view, from the fact that all the theories depend in some measure on societal expectations regarding appropriate gender roles at work and

at home: men acquiring human capital to provide for a family, wives helping their husbands, and men following socially acceptable patterns.

In addition, our results show that single men and married men with employed wives and no children earned levels of income similar to married men with employed wives and children. The fact that post-traditional family men did not earn more income than single men suggests that the "marital bonus" found in prior research (e.g., Dolton & Makepeace, 1987; Korenman & Neumark, 1991) does not apply to men with employed wives. This bonus is thus more accurately called a "traditional family bonus" that accrues only to men with children and not-employed wives. When that was the family structure of most managers, it may not have been so important to distinguish between different types of families. Now that the post-traditional family is dominant, the distinction is important. This finding confirms Pfeffer and Ross's prior research (1982), which reported that the presence of an employed spouse diminished the marital bonus.

Since the data are cross-sectional, causation may be questioned, and it has been suggested that wives may decide to stay at home when their husbands earn high salaries. Pfeffer and Ross (1982) concluded that their data did not support this interpretation. Interviews we conducted with women in our sample also suggested that this is not the case (Reitman & Schneer, 1988). For the most part, these women were at home because they could not find or could not afford adequate child care, or their work environments were not supportive, or they thought they should be at home with their children.²

This study suggests that, contrary to Hypothesis 2, the earnings of women in post-traditional families are similar to those of other married women and greater than those of single women. This finding is not consistent with prior research on women, which has suggested a negative relationship between parental status and income and no relationship between marital status and income (Dolton & Makepeace, 1987; Hill, 1979). Differences in the studies' samples, such as the work forces studied and the exclusion or inclusion of divorced women, may account for the inconsistent findings.

The only theory that can explain this finding is spousal support theory, according to which women in post-traditional families would earn more than single women because of their husbands' contributions to their careers. Changing gender stereotypes may account for the fact that the predominant view consistent with the other theories was not supported. Single women have been considered the model for the woman manager: people who could be committed to an organization because of minimal family responsibilities. Now they may be viewed more like single men: people with a potential for professional and geographic mobility that may make them less attached to an organization. Married women with children have been viewed as the least

² These women are not included in the respondents for this study as we focused on full-time workers; on average, they are somewhat more educated than the wives of the men in the sample.

stable employees because of their family responsibilities. Now they may be viewed as valuable resources who will be needed in the future (Vanderkolk & Young, 1991). When a married mother is in the work force and doing well, it suggests that she is able to balance all her responsibilities, probably will continue to do so, and should be paid accordingly. If these speculative changes in societal stereotypes are occurring, they could explain our results.³

Finally, this study shows that members of post-traditional families are more satisfied with their careers than members of traditional families. We did not anticipate this result for these individuals who depart from the successful manager model. However, their career paths may enable them to fulfill the multiple roles of spouse, parent, and worker (Sieber, 1974), and thus they may be very satisfied with their careers. Fitting the traditional successful manager model may not have been their goal. A popular term for the less demanding career path is "mommy (daddy) track" (Ehrlich, 1989). Our analysis shows that "post-traditional family track" might be a better term, as people are on this alternate course not because they have children, but because they have children and working spouses.

IMPLICATIONS

Our research makes a unique contribution to the literature on careers and family structure by using our typology to focus on all three dimensions of family structure—marital status, parental status, and spousal employment status—simultaneously, for both men and women. We have determined that the post-traditional family structure is an important one for managers and that analysis of income and career satisfaction benefits from distinguishing different structures. This finding suggests that researchers pay more attention to family structure in conducting research on career paths. The traditional two-dimensional approach, concerned with marital and parental status only, is insufficient, as spouse's employment status appears to be a critical component, and the dimensions are not independent.

A number of limitations should be noted. The members of our sample were largely from the northeastern United States, and there may be regional differences in the prevalence of various family structures and the relationship between family structures and careers. In addition, we limited our analyses to M.B.A. degree holders who were employed full-time, thus omitting women who have reduced their career pursuits. Other family structures not the focus of the present study, such as divorced or single parent, warrant future research. Longitudinal research is also needed to determine how movement from one family structure to another affects income and career satisfaction.

³ It is important to note, however, that women who cannot, or do not wish to, manage all the work-family responsibilities are likely to leave the full-time work force. In our sample, almost a quarter of the women were not employed full-time.

Our research has implications for organizations. The finding that men in post-traditional families are less rewarded than men in traditional families is somewhat disturbing. It suggests that men still need to fit the traditional managerial model to be rewarded by an organization. The findings for women are more hopeful, suggesting that employers now acknowledge that women do not have to give up marriage and children to be considered valuable resources. However, if organizations want to get the most from the available work force, they need to encourage, support, and reward all workers. One obstacle to such a program may be the continuing presence at the top of traditional family men who may not be aware of the needs of those in alternate family structures.

Organizations can change in two ways to meet the needs of families in which both parents work. They can offer programs such as extended leave, child-care assistance, care for the sick and elderly, and flexible benefits to ease family demands (Vanderkolk & Young, 1991). They can also work to revise the model of the successful manager to one that addresses the post-traditional family structure. For example, fewer hours, less travel, less relocation, and more flexible work routines than have typified managerial work in the past might be required. The latter type of change is more difficult to institute than the former, but ultimately more important. Since both managerial men and managerial women in post-traditional families are among those most satisfied with their careers, the generation of a new managerial model also has positive societal implications.

REFERENCES

- Blau, F. D., & Ferber, M. A. 1986. *The economics of women, men, and work*. Englewood Cliffs, NJ: Prentice-Hall.
- Bureau of Labor Statistics. 1989. *Handbook of labor statistics*. Bulletin 2340. Washington, DC: U.S. Government Printing Office.
- Devanna, M. A. 1984. *Male/female careers—the first decade: A study of MBAs*. New York: Columbia University Graduate School of Business.
- Dolton, P. J., & Makepeace, G. H. 1987. Marital status, child rearing and earnings differentials in the graduate labour market. *The Economics Journal*, 97: 897–922.
- Ehrlich, E. 1989. The mommy track. *Business Week*, March 20: 126–134.
- Hennig, M., & Jardim, A. 1977. *The managerial woman*. New York: Anchor Press/Doubleday.
- Hill, M. S. 1979. The wage effects of marital status and children. *Journal of Human Resources*, 14: 579–593.
- Kanter, R. M. 1977. *Men and women of the corporation*. New York: Basic Books.
- Korenman, S., & Neumark, D. 1991. Does marriage really make men more productive? *Journal of Human Resources*, 26: 283–307.
- LeLouarn, J. Y., Theriault, R., & Toulouse, J. M. 1984. Working spouses' impact on managers' career progression. *Relations Industrielles*, 39: 36–50.
- Madden, J. F. 1987. Gender differences in the cost of displacement: An empirical test of discrimination in the labor market. *American Economic Review*, 77: 246–251.

- Nieva, V. F. 1985. Work and family linkages. In L. Larwood, A. H. Stromberg, & B. A. Gutek (Eds.), *Women and work*, vol. 1: 162–190. Beverly Hills, CA: Sage.
- Olson, J. E., & Frieze, I. H. 1987. Income determinants for women in business. In A. H. Stromberg, L. Larwood, & B. A. Gutek (Eds.), *Women and work*, vol. 2: 173–206. Newbury Park, CA: Sage.
- Pfeffer, J., & Ross, J. 1982. The effects of marriage and a working wife on occupational and wage attainment. *Administrative Science Quarterly*, 27: 66–80.
- Reitman, F. 1985. *M.B.A. career paths—Are they different for men and women?: A study of Pace University's graduates*. Paper presented at the annual meeting of the Academy of Management, San Diego.
- Reitman, F., & Schneer, J. 1988. Career and family: How women M.B.A.s are handling dual roles. *Proceedings of the Northeast Business and Economics Association*: 110–112.
- Russo, N. F. 1985. Sex-role stereotyping, socialization, and sexism. In A. G. Sargent (Ed.), *Beyond sex roles*: 150–167. St. Paul: West.
- Schneer, J. A., & Reitman, F. 1990. Effects of employment gaps on the careers of M.B.A.s: More damaging for men than for women? *Academy of Management Journal*, 33: 391–406.
- Shepard, H. 1985. Men and organizational cultures. In A. G. Sargent (Ed.), *Beyond sex roles*: 374–381. St. Paul: West.
- Steber, S. D. 1974. Toward a theory of role accumulation. *American Sociological Review*, 39: 567–578.
- Talbert, J., & Bose, C. 1977. Wage-attainment processes: The retail clerk case. *American Journal of Sociology*, 83: 403–424.
- Vanderkolk, B. S., & Young, A. A. 1991. *The work and family revolution: How companies can keep employees happy and business profitable*. New York: Facts on File.
- Whyte, W. H., Jr. 1956. *The organization man*. New York: Simon & Schuster.
- World Almanac and Book of Facts*. 1992. New York: Pharos Books.

Joy A. Schneer is an associate professor of management at Rider College, School of Business Administration. She received her Ph.D. degree in organizational behavior from the City University of New York. Her current research interests include managerial career paths, career interruptions, women in management, and conflict management.

Frieda Reitman is an associate dean and a professor of management at the Lubin School of Business at Pace University. She received her Ph.D. degree in economics from the New School for Social Research. Her current research interests include gender issues in management and the careers of M.B.A. degree holders.

TOP MANAGEMENT TEAM SIZE, CEO DOMINANCE, AND FIRM PERFORMANCE: THE MODERATING ROLES OF ENVIRONMENTAL TURBULENCE AND DISCRETION

**JERAYR HALEBLIAN
SYDNEY FINKELSTEIN
University of Southern California**

Adopting an information-processing perspective and drawing on work in social psychology, this study examined the effects of top management team size and chief executive officer (CEO) dominance on firm performance in different environments. Data from 47 organizations revealed that firms with large teams performed better and firms with dominant CEOs performed worse in a turbulent environment than in a stable one. In addition, the association between team size and CEO dominance, and firm performance, is significant in an environment that allows top managers high discretion in making strategic choices but is not significant in a low-discretion environment.

Scholars in strategic management have recently emphasized the role of top management teams in strategy formation and organizational performance (Hambrick & Mason, 1984). In explaining the choices top managers make, scholars taking this perspective often emphasize the importance of understanding such demographic characteristics as the ages, organizational tenures, functional backgrounds, and educations of top managers as well as the distributional properties of those variables. Empirical work on the association between top team demographics and firm performance is not abundant, even though there is evidence that they are related (Norburn & Birley, 1988). For example, several researchers have examined the association between functional backgrounds and firm performance (Gupta & Govindarajan, 1984; Michel & Hambrick, 1992). Murray (1989) extended this work by examining temporal and occupational heterogeneity, reporting mixed results. Eisenhardt and Schoonhoven (1990) and Cooper and Bruno (1977), studying new ventures, reported associations between top team demographics and sales growth. Finally, in a study of bankrupt and survivor firms in a matched-pair sample, Hambrick and D'Aveni (1992) found that average top management team tenure and functional experience in marketing, operations, and R&D were lower in bankrupts than in survivors.

We would like to thank Gregory Dess and Yong Min Kim for their valuable comments on earlier drafts of this article.

This brief review indicates that important aspects of group composition have been somewhat underexplored; those aspects include both the extent to which a firm's chief executive officer (CEO) dominates the distribution of power within its top management team and the size of the team. CEO dominance and team size, both potentially important constructs because of their impact on the information-processing capabilities of top management teams, were the focus of this study.

A top management team can be considered the information-processing center of an organization in its relationship with its environment (Thompson, 1967). Environments vary in their degree of turbulence or stability (Dess & Beard, 1984) and in the degree of managerial discretion they permit (Hambrick & Finkelstein, 1987). Although environments can be characterized along several dimensions, in this study we focused on turbulence and discretion because of their expected impact on the relationship between top management team characteristics and performance.

Turbulence refers to volatility or difficult-to-predict discontinuities in an environment (Aldrich, 1979; Dess & Beard, 1984; Keats & Hitt, 1988). Turbulent environments increase both an organization's external linkages and the rate of change in those linkages (Aldrich, 1979; Emery & Trist, 1965). In contrast, stable environments are more predictable, with a more established set of relatively unchanging actors. Team size and power distribution help determine the nature of a top team's information-processing capabilities. Largeness provides increased capabilities and viewpoints, and a balanced power distribution facilitates information sharing and idea exchange, all of which can be critical in turbulent environments. Hence, an underlying premise to this study was that firms that match information-processing capabilities to environmental requirements do better than those that do not.

Managerial discretion refers to the latitude of action top management teams have in making strategic choices (Hambrick & Finkelstein, 1987). Although discretion can be conceptualized at individual, organizational, and environmental levels of analysis, in this study we focused only on environment-level discretion, henceforth called environmental discretion. Because environments differ in the extent to which they confer discretion to top managers, managerial characteristics will not always predict organizational outcomes. As a result, we would expect team size and CEO dominance to be related to performance when environmental discretion is high, but not when it is low.

BACKGROUND AND HYPOTHESES

Top Management Team Size

There has been relatively little work on the effects of team size in the research literature on top management teams, and team size has typically been modeled as a control variable (Bantel & Jackson, 1989; Jackson, Brett, Sessa, Cooper, Julin, & Peyronnin, 1991; Wagner, Pfeffer, & O'Reilly, 1984; Wiersema & Bantel, 1992). In one of the few studies that modeled team size

as a predictor variable, Hambrick and D'Aveni (1992) found that firms nearing bankruptcy tended to have smaller teams than matched-paired survivors. In addition, two studies of founding teams in high-technology firms reported that team size was associated with growth, ostensibly because larger teams provided more capabilities (Cooper & Bruno, 1977; Eisenhardt & Schoonhoven, 1990).

In contrast to the researchers studying top teams, social psychology scholars have been studying the effects of group size for some time. This work is informative because, although top teams are unique in terms of their level of decision-making responsibility and impact on the organizations, they are also similar to other groups in some fundamental ways. For example, other groups are "integrated by direct communication demands, interact[ing] functionally and continuously towards the achievement of an end" (James, 1951: 475), just as top teams are (Keck, 1990).

Steiner (1972) argued that group productivity is composed of potential productivity minus losses resulting from faulty process. He defined potential group productivity as the "maximum level of productivity that can occur when an individual or group employs its supply of resources to meet the task demands of the work situation" (1972: 68). However, evidence on how group size affects process gains and losses is conflicting.

Several scholars have argued that large groups are superior to small ones because big groups have more capabilities and resources with which to solve group tasks (Hill, 1982; Jackson, 1992; Shull, Delbecq, & Cummings, 1970). Large groups can enhance problem-solving capabilities by (1) increasing the number of items of information that can be absorbed and recalled, (2) increasing the number of critical judgments available to correct errors in inference and analysis, (3) increasing the number of potential solution strategies, and (4) increasing the range of perspectives brought to bear on a problem (Harrison, 1975; Hoffman & Maier, 1961; Shaw, 1981; Shull et al., 1970). Such an increase in capabilities and resources may help account for the higher-quality decisions sometimes reported in large groups (Cummings, Huber, & Arendt, 1974; Ziller, 1957). For example, a group's performance has been found to be a positive function of its members' abilities (Hoffman, 1979; Shaw, 1976), with increases in team size expanding the resources available to solve a problem (Hare, 1976). This view is consistent with Hambrick and D'Aveni's argument that "at a basic level, the resources available on a team result from how many people are on it" (1992: 1449). It is also the logic that Eisenhardt and Schoonhoven (1990) used in discussing why large teams were advantageous in the new ventures they studied. Hence, large top management teams have greater information-processing and decision-making capabilities than small teams.

Although the advantages of large groups are considerable, their size also tends to create coordination and communication problems that smaller groups do not have (Blau, 1970; Shaw & Harkey, 1976). Small groups tend to be more cohesive, and their members experience more satisfaction than is common in large groups (Shaw, 1981; Swap, 1984). They also tend to make

decisions and reach consensus faster than large groups (Shull et al., 1970; Thomas & Fink, 1963). So, although decision quality in small groups tends not to match that in large groups, small groups may be more appropriate when problem-solving tasks are relatively easy (Hare, 1952).

Environmental Turbulence as a Moderator

Although existing research is split on the relative merits of large and small top management teams, the team size that is appropriate may very well depend on an organization's environment. The degree of environmental turbulence or stability greatly influences the information-processing requirements of a top team and the complexity of managerial work. In much the same way that the nature of a group's task moderates the relationship between group size and productivity (Goodman, Ravlin, & Schminke, 1987), the turbulence of an organization's environment moderates the association between top team size and firm performance. The more turbulent the environment, the more varied and fragmented the nature of managerial work (Mintzberg, 1973) and the greater the information-processing demands on the top team (Daft, Sormunen, & Parks, 1988). As Galbraith argued, "The greater the task uncertainty, the greater the amount of information that must be processed among decision makers during task execution in order to achieve a given level of performance" (1973: 4). Turbulent environments increase information-processing needs by creating new opportunities and crises that often necessitate strategic and structural adaptations (Galbraith, 1973). Hence, as an environment grows more turbulent and a firm's decision-making tasks grow more difficult, managers have greater information-processing requirements.

Under these conditions, there is great need for large teams to cope with the added unpredictability of the environment (Thompson, 1967; Tushman & Keck, 1990). The greater information-processing capabilities of large teams (e.g., Shull et al., 1970) are needed to help firms adapt to the greater information-processing requirements of turbulent environments. The benefits that accrue from the enhanced capabilities of large teams are likely to outweigh the costs associated with the communication and coordination problems that also arise in large teams. As Miller noted, "The hiring of more managers to reduce the burden of the CEO" (1992: 162) may be needed in turbulent environments. Hence, we would expect firm performance to be positively associated with top team size in turbulent environments.

In contrast, although all top managerial jobs are characterized by some complexity, information-processing requirements are not as intense in stable environments (Ancona, 1990). For example, Kotter found that top managerial information and decision-making requirements in stable environments were "more standardized and routine" than in turbulent environments (1982: 29). Stable environments tend to attenuate learning requirements (Tushman & Keck, 1990), making problem solving more systematic than it is in turbulent environments (Eisenhardt, 1989). Thus, firms in stable environments cannot benefit as much from increases in top managerial inputs as

firms in turbulent environments. Yet, because such firms are prone to the same inefficiencies associated with increases in team size as firms in more turbulent environments, the costs associated with increases in team size may outweigh the benefits, creating process losses in excess of process gains. Hence, top teams in a stable environment may be more efficiently managed with a small group at the top.

Hypothesis 1: Top management team size will be more positively associated with firm performance in a turbulent environment than in a stable environment.

Distribution of Power Within Top Management Teams and CEO Dominance

Power is defined here as the capacity of individual actors to exert their will. This definition is consistent with other scholars' views (Pfeffer, 1981) and lends itself to an analysis of relative power among top managers in organizations. Although power often carries negative connotations (Pfeffer, 1981), there is no reason to expect any particular distribution of power, whether it conveys power to one person or distributes it more equally to many, to be more advantageous than another in a general sense. However, following our earlier arguments on team size, we considered it likely that the association between top team power and firm performance would depend on the nature of the environment.

Dominant CEOs tend to restrict the flow of information in "high-velocity" environments (Eisenhardt & Bourgeois, 1988). Such restriction may happen when a dominant CEO nullifies the contribution of a member with less power (Diesing, 1962) or when other team members fear reporting information or ideas that run counter to those preferred by a dominant CEO (Hambrick & D'Aveni, 1992). Alternatively, a top group may spend much of its time either supporting or rejecting the ideas of a powerful person, such as the CEO, rather than searching for alternative solutions to a problem (Maier & Hoffman, 1961). When information-processing requirements are low, as is generally true in more stable environments (Ancona, 1990), top teams with dominant CEOs may minimize process loss by restricting unnecessary communication and conflict. In addition, CEOs may be more likely to have sufficient information with which to make high-quality decisions in stable environments. In a review of the group size literature, Hill concluded that when tasks are relatively simple, as they would be in a stable environment, "Performance was often determined by one competent individual" (1982: 529). In contrast, because problems in a turbulent environment require substantial information processing (Daft et al., 1988), information restriction can lead to poor performance. When the distribution of power within a top team is balanced, the broader participation and information sharing needed to process complex decisions in turbulent environments is more likely to exist, enhancing firm performance. Hence, the impact of CEO dominance on firm performance is expected to differ in turbulent and stable environments.

Hypothesis 2: CEO dominance will be more negatively associated with firm performance in a turbulent environment than in a stable environment.

Environmental Discretion as a Moderator

Hypotheses 1 and 2 are based on the idea that environmental turbulence moderates the association between team size and CEO dominance, and firm performance. However, environments differ in the degree of discretion they confer to top management teams (Hambrick & Finkelstein, 1987). In high-discretion environments, top teams have a high degree of control over outcomes, so it makes sense to posit team effects on performance. But when environmental discretion is low, it is not clear that team characteristics such as size and power distribution get translated into performance outcomes. This logic suggests that the expectations summarized in Hypotheses 1 and 2 may only be supported in a high-discretion environment. As a result, an alternative hypothesis that recognizes the restricted latitude of options top teams face in low-discretion contexts is possible. Namely, when an environment constrains the range of choices top managers face, as low-discretion environments do, the effects of such factors as CEO dominance and team size on firm performance are likely to be attenuated. Hence, the following hypothesis underlines how environmental discretion serves as a complementary perspective to environmental turbulence by positing significant top team effects in a high-discretion environment, but not in a low-discretion environment.

Hypothesis 3: CEO dominance and team size will be significantly associated with firm performance in an environment allowing top managers a high level of discretion in strategic decision making but will not be significantly associated with firm performance in a low-discretion environment.

METHODS

Study Group

Interested in studying two industries that varied significantly in environmental turbulence and discretion, we chose the computer industry, which is characterized by continuous product innovation, high growth rates, and high product differentiation, as the turbulent, high-discretion environment, and chose the natural gas distribution industry, which is governed by regulations controlling pricing and capital acquisition, as the stable, low-discretion environment.¹ To confirm that those characterizations were cor-

¹ Although we considered industries in which turbulence and discretion did not covary, it was problematic to identify such industries. Some of the factors that promote discretion, such as product differentiability and demand growth, may also be related to turbulence. Nevertheless, all hypotheses are testable in the two industries we studied.

rect, we compared measures of environmental stability and environmental discretion across industries. Our two indicators of turbulence-stability were performance risk, measured as the average coefficient of variation of firms' return on assets from 1978 to 1982, and demand instability, measured as the average coefficient of variation of firms' sales from 1978 to 1982. The values of both indicators were significantly greater in the computer industry than in the natural gas industry, supporting our classification of those industries in terms of environmental turbulence.²

To measure environmental discretion, we relied on work by Hambrick and Finkelstein (1987). We computed the following indicators of environmental discretion for each industry studied: (1) the average advertising intensity, (2) the average R&D intensity, (3) the average annual sales growth, (4) the standard deviation of annual sales growth, and (5) the degree of regulation. The regulation indicator was based on the percentage of articles about either industry cited in *Funk & Scott Predicasts* that emphasized regulatory issues. These items corresponded to the environmental determinants of discretion Hambrick and Finkelstein (1987) discussed, with advertising intensity and R&D intensity signifying product differentiability, sales growth representing market growth, the standard deviation of sales growth representing sales instability, and the degree of regulation capturing regulatory constraints. We standardized these five indicators ($\bar{x} = 0$; s.d. = 1) and averaged them to yield an overall measure of environmental discretion; the degree of regulation was reverse-scored ($\alpha = .80$). The computed index score was .54 in the computer industry and $-.63$ in the gas industry ($t = 9.07$, $p < .001$), supporting our classification of those industries in terms of environmental discretion.

The names of 47 firms (26 computer and 21 natural gas distribution companies) for which data were available for all top management team members between 1978–82 were drawn from *Ward's Directory of 50,000 Largest U.S. Corporations*. With pooling, which is discussed below, there were 235 observations (47 firms for five years). The study group was restricted to large firms because (1) a fairly homogenous set of firms was required to ensure comparability and (2) it was difficult to obtain data on CEO dominance for smaller firms.

Given our focus on top teams as groups, we thought it important to study a relatively small set of managers at the top rather than a more diffuse cluster of top managers that might not really be a group. As a result, we defined a top management team as all corporate officers who were also board members (D'Aveni & Kesner, 1993). A manager's sitting on a firm's board of directors is an objective and formal indicator of membership in its dominant coalition, the group of top managers in the inner circle of an organization

² The means for performance risk and demand instability were 93.04 and 23.98 for firms in the computer industry and 42.58 and 14.22 for firms in the natural gas industry. The corresponding t-statistics were 3.05 ($p < .001$) for performance risk and 2.47 ($p < .01$) for demand instability.

that has ultimate responsibility for setting policy (Cyert & March, 1963; Thompson, 1967). In addition, such inside board membership represents an absolute cutoff point between top managers and other managers that is analogous across firms and industries. The study excluded all firms with only one inside board member because power distribution measures are not meaningful in such organizations.

Data were gathered from multiple sources. We collected data on top managerial characteristics from corporate proxy statements, *Standard & Poor's Directory of Directors*, and *Dun & Bradstreet's Reference Book of Corporate Management*. Data on firm characteristics were collected from COMPUSTAT, *Moody's Manual*, and *Standard & Poor's Directory of Corporations*.

Measures

Firm performance. Three indicators of performance were used: return on assets, return on sales, and return on equity. Following the recommendations of Venkatraman and Ramanujam (1986), we standardized these three indicators ($\bar{x} = 0$, s.d. = 1) and averaged their values to create a composite measure of firm performance. Correlations among these performance measures ranged from .75 to .89, with the global measure yielding a Cronbach alpha of .93.

Top management team size. We counted the number of corporate officers who were also board members in each firm for each year. The average size of the top management teams so defined was 3.39, with a standard deviation of 1.46.

CEO dominance. To assess CEO dominance for the large study group used here, we relied on ten objective measures of power that were thought to cumulatively explain overall power. Attempting to "provide a reasonably good approximation of the distribution of power" (Pfeffer, 1981: 59), we created an overall index of power by averaging the standardized ($\bar{x} = 0$, s.d. = 1) coefficients of variation for each of ten indicators of power over all top team members in each firm in each year. When the coefficient of variation is high, power is unevenly concentrated in a firm's CEO, so CEO dominance is high.³ When the coefficient of variation is low, power is relatively evenly distributed among team members; the distribution of power in such firms is balanced. The indicators we used were based on work by Finkelstein (1992). A brief description of each indicator follows, but we refer readers to Finkelstein for a fuller discussion of these measures and their validation.⁴

³ Actually, a high coefficient of variation only suggests that power is unevenly distributed and concentrated in one particular team member. However, when we examined teams with the highest coefficient of variation scores (the upper 20th percentile), we found that it was the CEO who scored highest in every case.

⁴ We did not use the ownership variables described in Finkelstein because "ownership power may not translate into active involvement in strategic decision making" (1992: 530). Given that our focus was on strategic decision making, it was important to include only those

(continued)

Percentage with higher titles was the percentage of individuals in a top team with higher official titles than a focal executive. The CEO is rated 0 on this variable, and the least powerful members of the top team are rated highest. Hence, this item was reversed in computing the CEO dominance index.

Compensation was defined as the total cash compensation an executive received divided by the compensation of the highest paid manager in the same firm (Hambrick & D'Aveni, 1992). In the case of the top earner in a firm, we divided by the pay of the second highest paid manager to avoid restricting the maximum score to 1.00.

Formal titles was operationally defined as the number of official titles a manager had. The values for this variable ranged from 1 to 3, with more titles signifying greater power (Harrison, Torres, & Kukalis, 1988).

Corporate boards was the number of corporate boards of which a focal top manager was a member. The number of board directorships an individual holds is an important indicator of external reputation (D'Aveni, 1990). In addition, directorships provide access to important information (Pennings, 1980) and important people in the "managerial elite" (Useem, 1979), enhancing a manager's prestige. Wade, O'Reilly, and Chandratat (1990) used this measure to assess managerial reputation.

Nonprofit boards was the number of boards of nonprofit corporations a focal manager sat on. Service to the community is an important aspect of a manager's membership in the managerial elite (Useem, 1979).

Average board rating was the average stock rating from Standard & Poor's Stock Surveys for all firms for which a manager was an external director. The rating is a further indicator of the prestige associated with external directorships.

Elite education is based on the rated prestige of the academic institutions a focal manager attended. The variable was coded as follows: 0, no formal higher education; 1, undergraduate and graduate schools are both nonelite; 2, undergraduate or graduate school (but not both) is elite; 3, both undergraduate and graduate schools are elite.

Expertise was based on the notion that managers who can cope with critical environmental contingencies will be powerful (Pfeffer, 1981). There were three steps involved in creating this variable. First, we determined the key environmental requirements in each industry. Adapting measures used by Hambrick (1981), we specified four types of environmental requirements corresponding to different sources of uncertainty in the task environment: inputs, representing an emphasis on supply conditions as a source of uncertainty; outputs, representing an emphasis on demand conditions; throughputs, representing an emphasis on production processes; and regu-

indicators of power that are likely to affect the phenomenon of interest. Including alternative indicators of power that might not be relevant to strategic decision making might have rendered the CEO dominance measure less effective.

latory concerns, representing an emphasis on regulatory conditions. We identified key environmental requirements by counting the number of articles cited in *Funk & Scott Predicasts* that emphasized each of the four contingencies.

Second, all functional areas that managers had direct experience in were identified. And third, we assessed managerial expertise by matching functional experience with environmental requirements as follows: purchasing, personnel, and exploration corresponded to inputs; sales and marketing and product R&D corresponded to outputs; operations, accounting, and process R&D corresponded to throughputs; and government service and law corresponded to regulatory concerns (Hambrick, 1981). The actual measure was computed by summing the proportion of articles cited featuring each environmental requirement for which a manager had corresponding functional experience. For example, the distribution of cites from the *Funk & Scott* analysis in the computer industry was inputs, .10; outputs, .63; throughputs, .18; and regulatory concerns, .09; hence, a manager with functional experience in marketing and law would score .72.

Functional areas was a count of the number of different functional areas a manager had experience in. It is a broader measure of experience that does not limit itself to the functional areas deemed important by *Funk & Scott*.

Positions in firm, defined as the number of different positions a manager has had in a firm, captured interactions with environmental actors. The wider a manager's external contacts, the greater his or her power (Thompson, 1967).

Control Variables

Although many variables may help explain firm performance, it is not possible to include them all. Our approach was to select control variables that appeared to be related to performance at multiple levels of analysis. We included control variables at the environmental level, the firm level, and the top management team level.

Environment. As we discussed above, the computer industry was characterized by significantly more environmental turbulence and discretion than the natural gas industry. We used one industry dummy variable, coding firms in the computer industry as 1 and firms in the natural gas industry as 0 (Dess, Ireland, & Hitt, 1990).⁵

Firm size. The size of a firm was included as a control variable because, given Hypothesis 1, it was important to ensure that team size was not confounded with firm size. To reduce "heteroscedasticity" (Kerlinger, 1973), we defined firm size as the natural logarithm of annual sales expressed in 1983 dollars.

Strategic unrelatedness. The nature and type of firm diversification may be related to firm performance (Bass, Cattin, & Wittink, 1977). Strategic

⁵ Results using the actual turbulence and discretion scores discussed earlier were identical to those reported below using an industry dummy variable.

unrelatedness was measured as the percentage of industries in which a firm was operating that were different from the company's primary industry; all industries were defined by two-digit Standard Industrial Classification codes. Similar measures of diversification based on product counts have been used for some time (Montgomery, 1982), and they have recently been recommended for use in research that models diversification as a control variable, as this study did (Hoskisson, Hitt, Johnson, & Moesel, 1993).

Efficiency. Cost factors may be important to success in the natural gas distribution industry; hence, we included a control for efficiency. To measure this construct, we standardized ($\bar{x} = 0$, $s.d. = 1$) and summed nonproduction overhead costs (selling, general, and administrative expenses to sales ratio, an indicator of cost inefficiency) and inventory levels (inventories to sales ratio, an indicator of lack of asset parsimony), and multiplied the results by -1 to bring the score in line with efficiency. Several previous studies have used nonproduction overhead and inventory levels to measure efficiency (e.g., Hambrick, 1983).

Borrowing capacity. Borrowing capacity, defined as equity over debt, represents the extent to which a firm has not tapped into potential sources of leverage. As such, it is a commonly used indicator of organizational slack (Bourgeois, 1981). When a firm's balance sheet reflects unused borrowing capacity, its debt payments tend to be lower, directly affecting performance. Given that firms in the natural gas industry in particular are highly capital-intensive, borrowing capacity may be an important determinant of firm performance.

Tenure heterogeneity and functional heterogeneity. At the top team level, we examined two team composition variables to control for team effects and to ensure that the power distribution and team size variables were not confounded with demographic heterogeneity. Tenure heterogeneity was measured as the coefficient of variation of tenure in a firm for top team members. Functional heterogeneity was measured with the formula $1 - \sum p_i^2$ (Blau, 1977), where p was the weighted proportion of each functional background represented on a team (weighted by the number of functions each manager had experience in) and i was the number of different areas of functional experience on the team.

Data Analysis

The data were pooled across firms and years. Although pooling yields more precise estimates because it makes a larger sample possible, the resulting observations are no longer independent because enduring individual firm characteristics are correlated over time. Hence, we used modified generalized-least-squares (GLS) models to control explicitly for autocorrelation (Hannan & Young, 1977). We tested Hypotheses 1 and 2 by conducting moderated regression analysis to assess the form of the relationship between team size and CEO dominance and firm performance (Arnold, 1982). Moderated regression analysis is an appropriate test of these hypotheses because they are relational. We used subgroup analysis to test Hypothesis 3 because

it predicts a significant effect in one industry but not the other. Subgroup analysis was the preferred analytical technique because Hypothesis 3 was nonrelational, making it necessary for us to independently test for main effects within each industry.

RESULTS

Table 1 presents means, standard deviations, and correlations among variables. Although we note significance levels, they should be interpreted with caution because the data have been pooled. Although there were several significant correlations among independent variables, the magnitude of those associations is not large ($r < .50$), indicating multicollinearity did not present a significant problem and that all the independent variables could be included in the GLS regressions.⁶

Table 2 presents regression analysis results. Because we used GLS regressions, the coefficients reported are not biased. Model 1 reports coefficients for control variables and main effects. Of note here are the significant coefficients for team size ($p < .05$) and CEO dominance ($p < .10$).

Hypothesis 1 predicts that team size will be more positively related to performance in the computer industry than in the natural gas industry. To test this hypothesis, we added the interaction of team size and the computer industry dummy variable to the base model. As is evident from model 2 of Table 2, this interaction term was positive and significant, supporting Hypothesis 1.⁷

Hypothesis 2 predicts that CEO dominance will be more negatively associated with firm performance in the computer industry than in the natural gas industry. To test this hypothesis, we added the interaction of CEO dominance and the computer industry dummy to the base model. As model 3 indicates, the coefficient for this interaction term was negative and significant, supporting Hypothesis 2.

Hypothesis 3 predicts that top team characteristics will be significantly associated with firm performance in the computer industry but not in the natural gas industry. We tested this idea by conducting two regression analyses, one for each industry. As the results reported in Table 3 indicate, the coefficients for team size and CEO dominance were significant in the computer industry but not in the natural gas industry, supporting Hypothesis 3.

⁶ Although correlations among independent variables were generally small, the association between firm size and strategic unrelatedness was .49. To ensure multicollinearity was not a problem, we conducted the same analyses reported below dropping each of these two variables in successive regression equations. Results did not change, indicating the correlation between firm size and strategic unrelatedness did not bias results.

⁷ We also tested the possibility that the relationship between team size and firm performance was curvilinear, with performance increasing with size up to a point and then decreasing because of process problems. When we added a squared term for team size to the model, the coefficients were not significant, indicating that, at least in our data, firm performance was a positive function of team size.

TABLE 1
Means, Standard Deviations, and Correlations for All Variables^a

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9
1. Computer industry	0.55	0.50									
2. Firm size	6.82	1.50	-.17**								
3. Strategic unrelatedness	5.78	5.31	.21**	.49**							
4. Efficiency	0.00	1.51	.00	.01	-.08						
5. Borrowing capacity	5.78	14.35	.30**	.02	.12†	.20**					
6. Tenure heterogeneity	45.86	31.57	-.08	.07	.07	-.18**	-.15*				
7. Functional heterogeneity	0.57	0.19	.23**	.11	.12	.01	.16*	-.18**			
8. Team size	3.39	1.46	.06	.41**	.31**	.11†	.31**	.21**	.32**		
9. CEO dominance	0.00	3.65	.00	.08	.00	.12†	.07	.07	.15*	.14*	
10. Firm performance	0.00	2.20	.29**	-.04	-.01	.14*	.20**	-.19**	.01	.11†	-.05

^a N = 235.

† $p < .10$

* $p < .05$

** $p < .01$

TABLE 2
GLS Regression Estimates of the Effects of Team Size and CEO
Dominance on Firm Performance^a

Variables	Model 1		Model 2		Model 3	
	<i>b</i>	s.e.	<i>b</i>	s.e.	<i>b</i>	s.e.
Intercept	-1.37	1.67	0.14	1.49	-1.53	1.28
Computer industry	1.67**	0.49	0.01	0.97	1.69**	0.49
Firm size	0.22	0.17	0.14	0.18	0.24	0.17
Strategic unrelatedness	-0.10*	0.04	-0.09*	0.04	-0.10*	0.04
Efficiency	-0.08	0.13	-0.12	0.13	-0.09	0.13
Borrowing capacity	0.00	0.01	0.00	0.01	0.00	0.01
Tenure heterogeneity	-0.01*	0.01	-0.01*	0.00	-0.01*	0.00
Functional heterogeneity	-1.79†	1.02	-2.12*	1.03	-1.88†	1.02
Team size	0.34*	0.17	0.11	0.17	0.34*	0.14
CEO dominance	-0.07†	0.04	-0.07†	0.04	0.05	0.07
Computer industry × team size			0.49*	0.25		
Computer industry × CEO dominance					-0.19*	0.08

^a *N* = 235.

† *p* < .10

* *p* < .05

** *p* < .01

DISCUSSION AND CONCLUSIONS

Effects of Team Size and CEO Dominance

This article presents the argument that environmental turbulence and discretion moderate the association between top management team size and CEO dominance, and firm performance. Our finding that large teams and teams with less dominant CEOs were more profitable in a turbulent environment (the computer industry) than in a stable environment (natural gas distribution) was consistent with our conceptualization of team size and CEO dominance as important information-processing variables.

The second major finding of this study was that top management team effects were not significant in the natural gas distribution industry. This industry is not only a stable one; it also constrains the choices available to top teams operating in it. With only a restricted level of discretion available to top managers, information processing within a top team may be of less consequence to performance than historical norms, standard operating procedures, and the actions of regulatory agencies (Hambrick & Finkelstein, 1987).⁸ Finkelstein and Hambrick (1990) suggested that top management

⁸ To test the idea that performance differences in a low-discretion industry may be due to historical, firm-specific factors that change little over time, we added binary variables for 20 of 21 natural gas firms and redid the analysis reported in Table 3. We found 6 of 20 binary
 (continued)

TABLE 3
GLS Regression Estimates by Industry^a

Variables	Computer Industry		Natural Gas Distribution Industry	
	<i>b</i>	s.e.	<i>b</i>	s.e.
Intercept	-0.17	1.97	-2.75†	1.56
Firm size	0.32	0.28	0.04	0.19
Strategic unrelatedness	-0.15*	0.06	-0.05	0.06
Efficiency	-0.15	0.21	-0.06	0.15
Borrowing capacity	-0.01	0.01	1.62*	0.44
Tenure heterogeneity	-0.02*	0.01	0.01	0.01
Functional heterogeneity	-3.22†	1.94	0.66	0.93
Team size	0.70**	0.24	0.07	0.12
CEO dominance	-0.11*	0.05	0.06	0.05

^a For the computer industry, *N* = 130; for the natural gas distribution industry, *N* = 105.

† *p* < .10

* *p* < .05

** *p* < .01

team characteristics may not predict organizational outcomes such as performance in low-discretion contexts.

Environmental turbulence and discretion appear to operate as complementary constructs. Turbulence and discretion are two important environmental dimensions that affect the relationship between top management team attributes and firm performance. However, these constructs are also complementary because predictions based on the impact of environmental turbulence were supported only when environmental discretion was high. In contrast, top team attributes were not predictive of outcomes when tested in a low-discretion environment. Hence, these results illustrate how environmental turbulence and discretion represent complementary explanations for the association between team size and CEO dominance, and firm performance.

Theoretical Implications, Limitations, and Directions for Future Research

The reported results have two important theoretical implications. First, it appears the increased capabilities and resources a large team brings to the strategic decision-making process are more advantageous in turbulent environments than in stable ones. Although this finding is consistent with re-

variables were significant at 5 percent or better, providing some support for this idea. Hence, it may be that firms that have done well in the past continue to do well because of inertial tendencies in the natural gas industry. For comparative purposes, we followed the same procedure in the computer industry by adding a series of binary variables for firms. In this case, only one firm binary variable was significant, supporting our supposition that it is organizational inertia that accounts for the significant binary variables in the natural gas industry.

search on group processes in social psychology, its implications for top teams and strategic decision making is new. In addition, this result suggests that team size, usually modeled as a control variable, may be a construct of some theoretical importance in research on top management teams.

The second important implication concerns the results for CEO dominance. Our findings are consistent with those of Eisenhardt and Bourgeois (1988), who found that top teams with dominant CEOs, which they referred to as "centralized," contributed to poor performance in a turbulent (high-velocity) environment. Given that precedent, the results of this study confirm that top managerial power is an important construct to model in research on top teams and strategic decision making (Finkelstein, 1992).

Several limitations of the study warrant discussion. First, our data were restricted to large firms, and our findings therefore may not be generalizable to small firms. Managerial effects may be more intense in small firms because they are less constrained by organizational inertia (Miller, Kets de Vries, & Toulouse, 1982). Second, although we stated our hypotheses in associational terms, the logic behind them implies that team size and CEO dominance "cause" performance. Unfortunately, even with multiple years of data it was not possible to completely disentangle causal direction. Third, our discussion of team size and CEO dominance focused on their effects on decision quality and firm performance. However, we did not explicitly consider the implementation process, which may affect outcomes, although it is complex (Nutt, 1989). Hence, our hypotheses should be considered *ceteris paribus*. Finally, to study team size and CEO dominance more effectively requires data on a greater number of industries. Important patterns emerged in our examination of two widely disparate industries, but our study of only two industries leaves considerable opportunity for other researchers.

Both top management team size and CEO dominance hold considerable promise as future research topics. The literature on group size in social psychology may help clarify issues of relevance to researchers on top management teams. For example, if large top management teams offer greater capabilities but also greater coordination and communication problems than small teams, managing team interactions to minimize process losses becomes critical. However, little research on top teams has addressed such process issues. CEO dominance also warrants further study. Although we found that CEO dominance influenced firm profitability differentially across environments, future work could focus on the strategic implications of CEO dominance. Questions of interest include the following: Do dominant CEOs seek firm growth above other objectives, such as profits? How do dominant CEOs affect top management team staffing and succession processes? Under what conditions could boards of directors remove dominant but underperforming CEOs? There are abundant research opportunities for scholars interested in learning more about such understudied top management team attributes as team size and CEO dominance. Hopefully, this article will help encourage such work.

REFERENCES

- Aldrich, H. E. 1979. *Organizations and environments*. Englewood Cliffs, NJ: Prentice-Hall.
- Ancona, D. G. 1990. Top management teams: Preparing for the revolution. In J. Carroll (Ed.), *Applied social psychology and organizational settings*: 99-128. Hillsdale, NJ: Erlbaum.
- Arnold, H. J. 1982. Moderator variables: A classification of conceptual, analytic, and psychometric issues. *Organizational Behavior and Human Performance*, 29: 143-174.
- Bantel, K., & Jackson, S. 1989. Top management and innovations in banking: Does the composition of the top team make a difference? *Strategic Management Journal*, 10: 107-124.
- Bass, F. M., Cattin, P., & Wittink, D. 1977. Market structure and industry influence on profitability. In H. Thorelli (Ed.), *Strategy + structure = performance*: 181-201. Bloomington: Indiana University Press.
- Blau, P. M. 1970. A formal theory of differentiation in organizations. *American Sociological Review*, 35: 201-218.
- Blau, P. M. 1977. *Inequality and heterogeneity*. New York: Free Press.
- Bourgeois, L. J., III. 1981. On the measurement of organizational slack. *Academy of Management Review*, 6: 29-39.
- Cooper, A. C., & Bruno, A. 1977. Success among high-technology firms. *Business Horizons*, 20(2): 16-22.
- Cummings, L. L., Huber, G. P., & Arendt, E. 1974. Effects of team size and spatial arrangements on group decision making. *Academy of Management Journal*, 17: 460-475.
- Cyert, R. M., & March, J. G. 1963. *A behavioral theory of the firm*. Englewood Cliffs, NJ: Prentice-Hall.
- Daft, R. L., Sormunen, J., & Parks, D. 1988. Chief executive scanning, environmental characteristics, and company performance: An empirical study. *Strategic Management Journal*, 9: 123-140.
- D'Aveni, R. A. 1990. Top managerial prestige and organizational bankruptcy. *Organization Science*, 1: 123-142.
- D'Aveni, R. A., & Kesner, I. F. 1993. Top managerial prestige, power and tender offer response: A study of elite social networks and target firm cooperation during takeovers. *Organization Science*, 4: 123-151.
- Dess, G. G., & Beard, D. 1984. Dimensions of organizational task environments. *Administrative Science Quarterly*, 29: 52-73.
- Dess, G. G., Ireland, R. D., & Hitt, M. A. 1990. Industry effects and strategic management research. *Journal of Management*, 16: 7-27.
- Diesing, P. 1962. *Reason in society*. Urbana: University of Illinois Press.
- Eisenhardt, K. M. 1989. Making fast strategic decisions in high-velocity environments. *Academy of Management Journal*, 32: 543-576.
- Eisenhardt, K. M., & Bourgeois, L. J., III. 1988. Politics of strategic decision making in high-velocity environments: Toward a midrange theory. *Academy of Management Journal*, 31: 737-770.
- Eisenhardt, K. M., & Schoonhoven, C. B. 1990. Organizational growth: Linking founding team, strategy, environment, and growth among U.S. semiconductor ventures, 1978-1988. *Administrative Science Quarterly*, 35: 504-529.
- Emery, F. E., & Trist, E. L. 1965. The causal texture of organizational environments. *Human Relations*, 18: 21-32.

- Finkelstein, S. 1992. Power in top management teams: Dimensions, measurement, and validation. *Academy of Management Journal*, 35: 505-538.
- Finkelstein, S., & Hambrick, D. C. 1990. Top-management-team tenure and organizational outcomes: The moderating role of managerial discretion. *Administrative Science Quarterly*, 35: 484-503.
- Galbraith, J. 1973. *Designing complex organizations*. Reading, MA: Addison-Wesley.
- Goodman, P. S., Ravlin, E., & Schminke, M. 1987. Understanding groups in organizations. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, vol. 9: 121-174. Greenwich, CT: JAI Press.
- Gupta, A. K., & Govindarajan, V. 1984. Business unit strategy, managerial characteristics, and business unit effectiveness at strategy implementation. *Academy of Management Review*, 27: 25-41.
- Hambrick, D. C. 1981. Environment, strategy, and power within top management teams. *Administrative Science Quarterly*, 26: 253-276.
- Hambrick, D. C. 1983. High profit strategies in mature capital goods industries: A contingency approach. *Academy of Management Journal*, 26: 666-707.
- Hambrick, D. C., & D'Aveni, R. A. 1992. Top team deterioration as part of the downward spiral of large corporate bankruptcies. *Management Science*, 38: 1445-1466.
- Hambrick, D. C., & Finkelstein, S. 1987. Managerial discretion: A bridge between polar views on organizations. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, vol. 9: 369-406. Greenwich, CT: JAI Press.
- Hambrick, D. C., & Mason, P. 1984. Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review*, 9: 193-206.
- Hannan, M., & Young, A. 1977. Estimation in multi-wave panel models: Results on pooling cross-section and time series. In D. Heise (Ed.), *Sociological methodology*: 52-83. San Francisco: Jossey-Bass.
- Hare, A. P. 1952. A study of interaction and consensus in different sized groups. *American Sociological Review*, 17: 261-268.
- Hare, A. P. 1976. *Handbook of small group research*. New York: Free Press.
- Harrison, E. F. 1975. *The managerial decision-making process*. Boston: Houghton Mifflin.
- Harrison, J. R., Torres, D. L., & Kukalis, S. 1988. The changing of the guard: Turnover and structural change in the top management positions. *Administrative Science Quarterly*, 33: 211-232.
- Hill, G. W. 1982. Group versus individual performance: Are $n + 1$ heads better than one? *Psychological Bulletin*, 91: 517-539.
- Hoffman, L. R. 1979. Applying experimental research on group problem solving to organizations. *Journal of Applied Behavioral Science*, 15: 375-391.
- Hoffman, L. R., & Maier, N. R. F. 1961. Quality and acceptance of problem solutions by members of homogenous and heterogeneous groups. *Journal of Abnormal and Social Psychology*, 58: 27-32.
- Hoskisson, R. E., Hitt, M. A., Johnson, R. A., & Moesel, D. D. 1993. Construct validity of objective (entropy and SIC-count-based) categorical measures of diversification strategy. *Strategic Management Journal*, 14: 215-235.
- Jackson, S. E. 1992. Consequences of group composition for the interpersonal dynamics of strategic issue processing. In P. Shrivastava, A. Huff, & J. Dutton (Eds.), *Advances in strategic management*, vol. 8: 345-382. Greenwich, CT: JAI Press.
- Jackson, S. E., Brett, J. F., Sessa, V. I., Cooper, D. M., Julin, J. A., & Peyronnin, K. 1991. Some

- differences make a difference: Individual dissimilarity and group heterogeneity as correlates of recruitment, promotions, and turnover. *Journal of Applied Psychology*, 76: 675-689.
- James, J. 1951. A preliminary study of the size determinant in small group interaction. *American Sociological Review*, 16: 474-477.
- Keats, B., & Hitt, M. 1988. A causal model of linkages among environmental dimensions, macro-organizational characteristics and performance. *Academy of Management Journal*, 31: 570-598.
- Keck, S. L. 1990. *Determinants and consequences of top executive team structure*. Unpublished doctoral dissertation, Columbia University, New York.
- Kerlinger, F. N. 1973. *Foundations of behavior research*. New York: Holt, Rinehart & Winston.
- Kotter, J. F. 1982. *The general managers*. New York: Free Press.
- Maier, N. R. F., & Hoffman, L. R. 1961. Organization and creative problem solving. *Journal of Applied Psychology*, 45: 277-280.
- Michel, J. G., & Hambrick, D. C. 1992. Diversification posture and top management team characteristics. *Academy of Management Journal*, 35: 9-37.
- Miller, D., Kets de Vries, M. F. R., & Toulouse, J. 1982. Top executive locus of control and its relationship to strategy making, structure, and environment. *Academy of Management Journal*, 25: 237-253.
- Miller, D. 1992. Environmental fit versus internal fit. *Organization Science*, 3: 159-178.
- Mintzberg, H. 1973. *The nature of managerial work*. New York: Harper & Row.
- Montgomery, C. A. 1982. The measurement of firm diversification: Some new empirical evidence. *Academy of Management Journal*, 25: 299-307.
- Murray, A. I. 1989. Top management group heterogeneity and firm performance. *Strategic Management Journal*, 10: 125-141.
- Norburn, D., & Birley, S. 1988. The top management team and corporate performance. *Strategic Management Journal*, 9: 225-237.
- Nutt, P. C. 1989. Selecting tactics to implement strategic plans. *Strategic Management Journal*, 10: 145-161.
- Pennings, J. M. 1980. *Interlocking directorates: Origins and consequences of connections among organizations' boards of directors*. San Francisco: Jossey-Bass.
- Pfeffer, J. 1981. *Power in organizations*. Marshfield, MA: Pitman.
- Shaw, M. E. 1976. *Group dynamics*. New York: McGraw-Hill.
- Shaw, M. E. 1981. *Group dynamics*. New York: McGraw-Hill.
- Shaw, M. E., & Harkey, B. 1976. Some effects of congruency of member characteristics and group structure upon group behavior. *Journal of Personality and Social Psychology*, 34: 412-418.
- Shull, F. A., Delbecq, A. L., & Cummings, L. L. 1970. *Organizational decision making*. New York: McGraw-Hill.
- Steiner, I. D. 1972. *Group process and productivity*. New York: Academic Press.
- Swap, W. C. 1984. *Group decision making*. Beverly Hills: Sage.
- Thomas, E. J., & Fink, C. F. 1963. Effects of group size. *Psychological Bulletin*, 60: 371-384.
- Thompson, J. D. 1967. *Organizations in action*. New York: McGraw-Hill.
- Tushman, M., & Keck, S. 1990. *Environmental and organizational context and executive*

- team characteristics: An organizational learning approach.** Working paper, Columbia University Graduate School of Business, New York.
- Useem, M. 1979. The social organization of the American business elite and participation of corporation directors in the governance of American institutes. *American Sociological Review*, 44: 553–572.
- Venkatraman, N., & Ramanujam, V. 1986. Measurement of business performance in strategy research: A comparison of approaches. *Academy of Management Review*, 11: 801–814.
- Wade, J., O'Reilly, C. A., III, & Chandratat, I. 1990. Golden parachutes: CEOs and the exercise of social influence. *Administrative Science Quarterly*, 35: 587–603.
- Wagner, G. L., Pfeffer, J., & O'Reilly, C. A. 1984. Organizational demography and turnover in top management groups. *Administrative Science Quarterly*, 29: 74–92.
- Wiersema, M. F., & Bantel, K. A. 1992. Top management demography and corporate strategic change. *Academy of Management Review*, 35: 91–121.
- Ziller, R. C. 1957. Group size: A determinant of the quality and stability of group decisions. *Sociometry*, 20: 165–173.

Jerayr Haleblian is currently working on his Ph.D. degree in management and organization at the University of Southern California. His current research interests include top management teams and organizational change.

Sydney Finkelstein is an assistant professor of management and organization in the Graduate School of Business Administration at the University of Southern California. He received his Ph.D. degree at Columbia University. His current research interests include the analysis of discretion and power in top management teams, executive compensation, corporate governance, and institutional processes in strategic management.

GHOSTS OF MANAGERS PAST: MANAGERIAL SUCCESSION AND ORGANIZATIONAL MORTALITY

HEATHER A. HAVEMAN
Duke University

This study investigated the effects of managerial succession on organizational mortality, applying dynamic models to longitudinal data and exploring the impact of succession over time. The model included the succession of managers and firm presidents. Small organizations, which are likely to be homogeneous in their response to succession, were studied. Succession increased organizational mortality. These effects diminished as time passed and were stronger in younger organizations. Presidential exit had greater impact than the turnover of other managers.

The exit of the president or of another manager is an important event in the history of any organization. Scholars have long been interested in managerial succession because they seek to answer two questions. First, do managers make a difference (Calder, 1977; Meindl & Ehrlich, 1987; Meindl, Ehrlich, & Dukerich, 1985; Pfeffer, 1981)? If management possesses merely symbolic value, succession should not affect firm performance. But if management has instrumental value, changing managers should affect performance appreciably. Second, if managers do make a difference, how does succession affect performance? Does it facilitate adaptation to shifting environmental demands (Guest, 1962; Helmich, 1974; Pfeffer & Salancik, 1978), or does it siphon resources away from reorganizing, thus rendering performance unreliable and survival unlikely (Hannan & Freeman, 1989)? These questions continue to intrigue organizational scholars because the empirical findings are inconsistent.

Three arguments have been made about the effect of succession on performance. According to the succession-crisis hypothesis, managerial succession diminishes organizational performance, because it disrupts work routines, interrupts command, and increases employee insecurity (Allen, Panian, & Lotz, 1979; Carroll, 1984; Gouldner, 1954; Grusky, 1963). These unsettling changes increase conflict and lower morale, to the detriment of organizational performance. A vicious circle operates: poor organizational

Glenn Carroll, Harris Sondak, and Anand Swaminathan made helpful comments on drafts of this article. The comments of two anonymous reviewers are gratefully acknowledged. Sins of omission and commission remain, of course, my own.

performance leads to succession, which in turn disrupts operations and further worsens performance (Grusky, 1963). This scenario is especially likely if managerial turnover occurs early in an organization's life, or if it is involuntary or unplanned (Carroll, 1984).

In contrast, the succession-adaptation hypothesis is the argument that succession improves performance by reducing conflict (Carroll, 1984; Guest, 1962). Succession provides a conduit for external information, which enables an organization to become better attuned to environmental demands (Helmich, 1974; Pfeffer & Salancik, 1978; Singh, House, & Tucker, 1986; Virany, Tushman, & Romanelli, 1992) or to signal its intentions to change (Reinganum, 1985).

Finally, there may be a null relationship between succession and organizational performance, for two reasons. If managerial action is purely symbolic (Calder, 1977; Meindl & Ehrlich, 1987; Meindl et al., 1985; Pfeffer, 1981), succession will be a ritual scapegoating and will not substantially affect performance (Gamson & Scotch, 1964). Any negative relationship found between succession and performance can be attributed to regression to the mean (Brown, 1982; Eitzen & Yetman, 1972). Alternatively, organizational structure and external forces may constrain executive action and minimize managerial impact (Hannan & Freeman, 1989: 40–44; Lieberman & O'Connor, 1972; Salancik & Pfeffer, 1977).

The inconsistent findings of previous investigations may be due to a problem in research design. Early research applied static models to cross-sectional data. This practice raises a serious concern because turnover is an inherently dynamic phenomenon that requires dynamic analysis. The findings of static analyses will be ambiguous or misleading if the assumption of temporal equilibrium is incorrect (Tuma & Hannan, 1984). In the past decade, organizational scholars have studied the consequences and causes of turnover dynamically (e.g., Brown, 1982; Carroll, 1984; Pfeffer & Davis-Blake, 1986; Singh et al., 1986; Virany et al., 1992).

Previous research has studied the effects of succession on a wide range of outcomes, including conflict (Guest, 1962); sports team win-loss records (Allen et al., 1979; Brown, 1982; Eitzen & Yetman, 1972; Gamson & Scotch, 1964; Grusky, 1963, 1964; Pfeffer & Davis-Blake, 1986); financial returns (Reinganum, 1985; Virany et al., 1992); and growth (Helmich, 1974). In the research reported here, the outcome of interest was organizational mortality, a fundamental standard of organizational performance (Starbuck, 1965: 463–464) that has frequently been investigated in the organizational ecology and strategy literatures. Two studies have assessed the impact of succession on mortality, yielding opposite results. Carroll (1984) found that the exit of the founding editors of newspapers increased these firms' mortality rates. In contrast, Singh and colleagues (1986) found that chief executive officer (CEO) succession improved the survival changes of voluntary social service organizations. Clearly, the limited and conflicting evidence researchers have to date suggests that the relationship between managerial succession and organizational mortality needs further investigation.

HYPOTHESES

A number of contingency factors affect the succession-performance relationship. Previous research has studied many of these; two examples are type of succession, whether internal or external (Brown, 1982; Carroll, 1984; Gouldner, 1954; Reinganum, 1985; Virany et al., 1992), and ownership structure (Carroll, 1984). One neglected contingency factor is organizational size. Size is arguably the dominant variable in the sociological literature on organizations (see Kimberly [1976] and Scott [1992: 258–267] for reviews). Hence, considering the moderating role size plays in the succession-performance relationship is a reasonable undertaking. Individual managers generally have more impact on small organizations than on their large counterparts. Small organizations tend to have simple rather than complex structures—little technostructure, a loose division of labor, a small managerial hierarchy with a small support staff, and little formalization of behavior (Mintzberg, 1979: 305–313). Small organizations are driven by the preferences of one or a few individuals who control the organizations through direct supervision. Managers of small organizations are less the products of “homosocial” reproduction than are executives in large firms, so they exhibit greater variation in personal characteristics and experience (Kanter, 1977). As a result, individual differences in managers’ personal characteristics and preferences will explain more variance in performance for small organizations (Preisen-doerfer & Voss, 1989). Moreover, large organizations bureaucratize the succession process, rendering it less disruptive than it is in small organizations (Grusky, 1961). In sum, the succession-performance relationship will be stronger in small organizations than in large ones.

Why should researchers care about small organizations? Small organizations greatly outnumber large organizations (Aldrich & Auster, 1986). Granovetter (1984) argued forcefully that small organizations employ a large proportion of all workers and so merit more attention than they have received. Small organizations also account for a substantial amount of important economic activity, notably job creation and the innovation that spurs economic growth (Birch, 1987). Despite the ubiquity and importance of small organizations, most research on the effects of managerial succession has focused on large bureaucracies. Looking at small organizations offers one way to assess the generalizability of hypotheses linking management behavior and organizational performance.

Succession in small organizations will diminish performance and increase the rate of failure. The positions of small-firm managers are not separate from the personalities and skills of the individuals who fill them. The attitudes, abilities, and goals of individual jobholders greatly influence the nature of these idiosyncratic jobs (Miner, 1987). Moreover, when managers leave a small organization, they take along a great deal of tacit operational and organizational knowledge. Succession in a small organization is therefore not merely a symbolic action, nor can it be expected to improve performance or diminish the chance of failure. Each succession event will restart

the organization's "liability-of-newness" clock (Amburgey, Kelly, & Barnett, 1993; Carroll, 1984; Freeman, Carroll, & Hannan, 1983; Singh et al., 1986) as organizational members adjust to new managers. New managers will bring with them new modes of action and new priorities that must be learned and routinized. In addition to changes in internal operations, managerial succession entails shifts in relations with a company's external environment. Top managers play important boundary-spanning roles. Therefore, succession at the top disrupts external relations with suppliers, clients, and local communities. During the adjustment period that follows succession, organizational performance will be more variable and failure rates will be higher (Hannan & Freeman, 1989: 66–90).

The relationship between managerial succession and organizational performance is complicated and circular, however. Top managers are typically blamed for poor performance, removed for unsatisfactory performance, and replaced by new managers who are expected to improve performance (Boeker, 1992). Considerable evidence suggests that managerial effectiveness tends to decline over time because political capital, goodwill, and energy are dissipated (Hambrick & Fukutomi, 1991) and the match between shifting environmental demands and managerial capabilities deteriorates (Virany et al., 1992). Hence, any investigation of the causes of managerial succession must control for past organizational performance.

Researchers have neglected an important contingency factor in the succession-performance relationship—time. This neglect has occurred largely because of the limitations of cross-sectional research designs. Time, by which I mean both the time elapsed since a succession and the timing of succession in the organizational life cycle, is important because it captures organizational history; thus, including time in models of succession makes it possible to investigate history dependence. Scholars have argued convincingly that research that does not incorporate information on prior history will provide an incomplete and potentially misleading picture of organizations (e.g., Zald, 1990). Previous research has not studied how long the effects of succession persist, although there has been some speculation on this matter (Amburgey et al., 1993). Previous research has seldom taken into consideration when succession occurred in an organization's history, although timing in the life cycle may moderate the relationship between succession and performance (Carroll, 1984; Gamson & Scotch, 1964; Singh et al., 1986). Finally, previous research has not investigated the impact of multiple succession events, although frequent succession has been posited to disrupt organizational routines and diminish performance (Allen et al., 1979; Grusky, 1963), suggesting that more than one isolated succession event should be investigated. This study tackled all of these issues related to time and succession.

As time passes and an organization settles into new routines, the impact of succession should diminish. Amburgey and colleagues (1993) found that the deleterious effects of changes caused by succession in small Finnish newspapers—changes in publication periodicity and in content—dimin-

ished over time. However, there is no evidence as to how long the changes wrought by managerial succession linger. I propose that succession, like other core changes, should have a fleeting effect that is greatest immediately after the event. Organizations that have experienced succession and survived rebuild internal processes and external relations. Just as the hazard of failure diminishes as new organizations develop coherent and reliable internal structures and establish stable external relations over time, so the hazard of failure diminishes as organizations that have experienced succession adjust, both internally and externally, to new leadership.

Hypothesis 1: The effect of managerial succession on an organization will diminish as time passes.

The effect of succession will be different for organizations at different points in their lives. The interaction between organizational age and succession may be positive or negative. On the one hand, theoretical reasoning (Hannan & Freeman, 1989: 80) and empirical evidence for Finnish newspapers (Amburgey et al., 1986) suggest a positive relationship. Older organizations are more likely to fail following the disruption caused by nontrivial changes such as managerial succession because their routines have become more institutionalized than the routines of younger organizations. On the other hand, younger organizations may be more likely to fail following succession because the first succession event is a critical transition in the organizational life cycle (Carroll, 1984), and organizations routinize succession as they develop. This reasoning suggests a negative interaction. Previous studies of the succession-mortality relationship have found that succession early in an organization's life had greater effect than did later succession (Carroll, 1984; Singh et al., 1986). Given the scanty and conflicting evidence available, this relationship deserves further investigation. Accordingly, I tested a nondirectional hypothesis.

Hypothesis 2: The effect of managerial succession will vary with organizational age.

Most research has studied chief executives only and has ignored other members of management teams. Virany and colleagues (1992) found that effective reorientation of organizational strategy may require the succession of an entire executive team. By implication, studies of the effects of managerial succession should consider the turnover of managers other than a firm's chief executive. Such investigation is especially important since power does not rest solely in the hands of chief executives (Finkelstein, 1992). The exit of an organization's president is likely to have more impact than the exit of other managers, primarily because the president is generally a more powerful actor than other managers (Boeker, 1992; Finkelstein, 1992).

Hypothesis 3: The succession of a president will have a stronger impact on the rate of organizational mortality than will the succession of other managers.

METHODS

Data

This research studied the consequences of managerial succession for a group of small organizations: firms in the early telephone industry in rural Iowa. Because all the organizations studied were small, succession was likely to have a strong, negative effect on performance. In this research setting, I could investigate how that effect varied with time and whether it differed according to whether the individuals succeeded were chief executives or other managers.

The data used record the organizational life histories of all telephone companies that existed in three counties of southeastern Iowa between the years 1900 and 1917 (for details, see Barnett and Carroll [1987]). Information exists on all individuals who were recorded on tax forms as having worked for these companies. Data were collected on all individuals who worked in managerial jobs in those companies: company presidents, secretaries, treasurers, vice presidents, and general managers. The data, which represent 243 firms and 1,230 individuals, are broken down into annual spells. All variables were updated each year. Independent and control variables were measured at the beginning of each one-year period, and the dependent variable, failure, was measured at the end of each period.

Research Setting: The Early Telephone Industry in Southeastern Iowa, 1900–17

Early telephone companies often operated on a very small scale, with part-time managers who were full-time farmers, shopkeepers, or tradesmen (MacMeal, 1934). The owner-operators of these telephone companies were motivated by communitarian rather than pecuniary interests. Because the role of an early telephone company manager was not the same as that of a modern corporate executive, turnover of telephone company managers is not the same as executive succession in large corporations. Instead, managerial succession in telephone companies closely resembled succession in entrepreneurial ventures and family-run firms. When a telephone company manager left the organization, he took along a great deal of tacit operational and organizational knowledge.¹ Furthermore, the manager would not be the only member to leave—his wife and daughters (the switchboard operators) and his sons (the linemen, repairmen, and installers) would also leave (Brock, 1981; MacMeal, 1934). Succession in this context therefore had instrumental value and could be expected to harm a company's survival chances.

These organizations differed substantially from the organizations generally studied by organizational scholars: rural telephone companies before World War I were very different from large, modern, corporate bureaucracies. The idiosyncrasies of this population are valuable in assessing the

¹ Almost all managers of these telephone companies were men.

limits of organizational theory, answering the question, "Can theories of succession generalize beyond the *Fortune* 500, or beyond modern corporations of any size?" In order to test theories of organizations thoroughly, researchers must search far and wide, applying theories to a variety of settings (Stinchcombe, 1968). Thus, an important advantage of this research setting is its novelty.

Variables

Organizational failure. Failure was measured by an indicator variable that equaled one if an organization failed in any period and zero if it survived to operate in the next period.

Managerial succession. Two sets of dummy variables measured the exits of the presidents and other managers of the firms studied (vice presidents, treasurers, secretaries, and general managers). I set each dummy variable equal to one during the period between the i th and $(i + 1)$ th succession event and equal to zero otherwise. No data were available on the duties of the secretaries, vice presidents, treasurers, and general managers that made it possible to differentiate meaningfully among them. Therefore, I combined all those positions into one group. The exit of any one secretary, vice president, treasurer, or general manager was sufficient to code the occurrence of a managerial succession event. Of course, some organizations experienced the simultaneous exit of two or more managers.

Time clocks. Two time clocks were used in this analysis: organizational age and duration since succession. Age was measured in years since founding. Following Carroll (1984) and Amburgey and colleagues (1993), I set duration since succession equal to zero until the first succession occurred. The variable then recorded the time elapsed since succession in years. If another succession occurred, the clock was reset to zero and then again recorded time elapsed.

Control variables. Previous research on this population of telephone companies has shown that organizational form and size influenced organizational mortality rates (Barnett & Carroll, 1987). I controlled for those variables in several ways. The distinction between mutual and commercial companies was captured with a variable set equal to one for commercial companies and zero for mutual companies. Capital structure was represented by a variable that equaled one if a firm issued stock to raise capital and zero otherwise. Technological capability was controlled for with a dummy variable that equaled one if a company offered long-distance service and zero otherwise. Size was measured in terms of the number of telephones in a firm's system. A fourth dummy variable controlled for left truncation of the data (Cox & Oakes, 1984: 177–178), since 16 of the firms were born before the observation period began in 1900. I also controlled for competitive conditions with a variable for density, or the number of telephone companies operating in a given year. Finally, previous research has found that past performance influences succession (e.g., Allen et al., 1979; Beatty & Zajac, 1987; Eitzen & Yetman, 1972; Puffer & Weintrop, 1991); moreover, perfor-

mance is also an obvious factor affecting organizational survival. I controlled for the possible spurious relationship between performance, succession, and mortality (Brown, 1982; Eitzen & Yetman, 1972) by including a measure of organizational growth, which has often been used to assess organizational effectiveness (Scott, 1992: 342–362). I measured performance as the one-year change (increase or decrease) in the number of subscribers to a telephone company.

Model Specification and Estimation

Following Barnett and Carroll (1987: 407), I estimated Gompertz models of the organizational mortality rate of the following form using the program RATE (Tuma, 1980):

$$r(t) = \exp[\beta_0 + \beta_1 X(t) + \beta_2 S_i(t) + \beta_3 S_i(t) \times A(t) + \beta_4 D(t)],$$

where $r(t)$ is the organizational mortality rate, $\exp[\beta_0]$ is the base rate, $X(t)$ is a vector of control variables measured each year (including organizational age), $S_i(t)$ is a vector of dummy variables indicating succession events, $A(t)$ is organizational age in years, and $D(t)$ is a pair of variables indicating elapsed duration since the most recent presidential and managerial succession events. The coefficient vector, $\{\beta_1 \beta_2 \beta_3 \beta_4\}$, is a multiplier of the base rate of organizational mortality.

The main effect, succession's effect on the mortality rate, is captured by S_i .² I tested the first hypothesis, that the effects of succession diminish as time passes, using $D(t)$. The second hypothesis, concerning the impact of succession at different stages in the organizational life cycle, was tested using the interaction terms $S_i(t) \times A(t)$. I tested the third hypothesis, about the relative magnitude of the effects of presidential exit and the exit of other managers, by comparing those effects.

RESULTS

Table 1 presents descriptive population statistics. Half the individuals who were succeeded were company presidents. The rest were mostly company secretaries, with a few vice presidents and treasurers. Most of the firms studied were small, having only one or two officers. The maximum number of succession events experienced by any organization during the observation period was seven presidential exits and ten exits of other managers. Ninety percent of firms experienced four or fewer of either type of event during the observation period. Table 2 shows the frequency of successions.

Table 3 presents means, standard deviations, and bivariate correlations for all variables. Five out of the eight correlations between organizational failure and managerial succession variables are positive, offering weak evi-

² The maximum number of succession events studied here is four. Only 7 percent of firms experienced five or more presidential exits; 11 percent experienced five or more managerial exits. Because there is so little variance on the variables indicating fifth and higher-order succession events (almost all zeros, very few ones), these variables do not show significant effects on organizational mortality.

TABLE 1
Population Characteristics

Characteristics	Number	Percentage
Total telephone companies	243	
Mutual companies	216	
Commercial companies	27	
Stock-issuing companies	153	
Companies offering long-distance service	36	
Average number of subscribers	382	
Average age in years	7	
Firms born before 1900	16	
Organizational deaths	56	
Presidents	615	50.0
Vice presidents	23	1.9
Company secretaries	540	43.9
Treasurers	29	2.4
General managers	23	1.9
Total managers	1,230	100.0

TABLE 2
Frequency Distribution of Managerial Succession Events

Variables	Number of Companies											Total Exits
Frequency	0	1	2	3	4	5	6	7	8	9	10	
Presidents	47	64	53	41	20	9	5	4	0	0	0	476
Other managers	51	77	46	32	9	14	6	4	1	2	1	471

dence in support of the succession-crisis model. The correlations between failure and both duration variables (the time elapsed since the last succession of a president or of another manager) are negative, which offers preliminary support for Hypothesis 1.

Table 4 presents the results of the event-history analysis of these hypotheses.³ Model 1 includes only the control variables for organizational form, size, growth, age, and population density. Model 2 introduces indicator variables for the temporary effect of presidential exit. All parameter estimates are positive and significant, providing strong support for the succession-crisis model: succession increases the organizational death rate. This model fits the data far better than does model 1, according to the chi-square likelihood-ratio test ($\Delta\chi^2 = 66.0$, $\Delta df = 4$, $p < .001$). Model 3 includes the succession-age interaction variables. These variables are negative, but only two are statistically significant ($\Delta\chi^2 = 6.6$, $\Delta df = 4$, $p > .10$). These results offer weak support for the proposition that succession has stronger ef-

³ I also analyzed data on mutual companies only. The results are very similar to those presented here and are available upon request.

TABLE 3
Means, Standard Deviations, and Correlations^a

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Failure	0.02	0.14																		
2. First presidential exit	0.28	0.45	.09																	
3. Second presidential exit	0.16	0.37	.02	-.28																
4. Third presidential exit	0.07	0.26	.03	-.17	-.12															
5. Fourth presidential exit	0.03	0.17	-.01	-.11	-.08	-.05														
6. Duration since last presidential exit	1.34	2.34	-.05	.43	.14	.01	-.01													
7. First managerial exit	0.31	0.46	.06	.16	.05	-.04	-.04	.10												
8. Second managerial exit	0.18	0.37	-.01	.05	.10	.07	.02	.12	-.29											
9. Third managerial exit	0.06	0.24	.03	-.11	.12	.11	.09	.04	-.17	-.11										
10. Fourth managerial exit	0.03	0.17	-.03	-.02	-.01	.17	.11	.04	-.12	-.08	-.05									
11. Duration since last managerial exit	1.53	2.56	-.05	.05	.14	.07	.10	.39	.44	.13	.01	-.02								
12. Commercial company	0.12	0.33	.03	.04	-.10	-.08	-.06	.03	-.02	.05	.01	-.02	.05							
13. Stock company	0.75	0.43	-.09	.04	.04	.02	.05	.07	.04	.07	.09	.02	.06	.04						
14. Long-distance service	0.17	0.38	-.03	.03	-.07	-.03	-.06	.45	-.02	.06	.06	-.03	.09	.73	.02					
15. Size ^b	3.29	1.38	-.07	.04	-.03	-.01	-.01	.11	.01	.09	.07	.02	.02	.65	.17	.75				
16. One-year growth	0.07	0.68	.02	-.02	-.03	-.01	-.01	-.04	-.04	-.01	-.02	-.01	-.04	.12	.01	.12	.10			
17. Age	6.71	4.87	-.05	-.02	.20	.25	.18	.39	.03	.22	.18	.14	.43	.08	.14	.16	.21	-.08		
18. Firms born before 1900	0.08	0.27	.02	.06	-.06	-.02	-.04	.09	-.05	.05	-.05	-.04	.02	.39	-.02	.36	.30	-.02	.29	
19. Density	173.49	24.48	-.01	.02	.19	.16	.11	.28	.07	.17	.13	.09	.29	-.14	-.05	-.11	.01	-.20	.53	-.18

^a These statistics are calculated using pooled cross-sectional and time-series data covering 243 firms and 2,767 one-year firm-periods.

^b Size is measured by number of subscribers.

TABLE 4
Effect of Succession on Organizational Mortality^a

Variables	Models									
	1	2	3	4	5	6	7	8	9	10
Constant	-2.72*	-3.58*	-5.03**	-4.98**	-3.02*	-3.70*	-3.77**	-3.80**	-5.30***	-5.33***
Commercial company	1.84**	2.27***	2.37***	2.11***	2.17**	2.16***	2.23***	2.47***	2.56***	2.25***
Stock	-0.76*	-0.94***	-0.92**	-0.88**	-0.94**	-0.87**	-1.04***	-1.00***	-1.01***	-1.05***
Long-distance service	-0.46	-0.75	-0.87	-0.51	-0.80	-0.81	-0.89	-1.02	-1.11	-0.90
Size	-0.51***	-0.56***	-0.54***	-0.53***	-0.61***	-0.56***	-0.52***	-0.58***	-0.53***	-0.46**
One-year growth	0.12	0.18	0.23*	0.21*	0.17	0.18*	0.18*	0.21*	0.25*	0.24*
Firms born before 1900	-0.24	0.33	0.35	-0.21	0.38	0.14	-0.09	0.59	0.43	-0.08
Density/100	0.45	-0.11	0.51	0.46	3.48	3.70	3.65	-1.19	-1.09	-0.21
Age	-0.02	-0.10*	-0.12	-0.12	-0.08	0.04	0.05	-0.11*	0.13	0.14
First presidential succession	3.14***	3.14***	4.55***	4.55***				2.93***	4.27***	4.12***
Second presidential succession	3.26***	3.26***	4.83***	4.59***				2.93***	4.48***	4.18***
Third presidential succession	3.74***	3.74***	4.15*	3.71*				3.39*	3.85*	3.53*
Fourth presidential succession	2.95*	2.95*	1.83	1.75				2.74*	1.72	2.07
First managerial succession					1.80***	2.75***	2.76***	0.92*	1.33*	1.31*
Second managerial succession					1.42**	2.37**	2.40**	0.42	0.66	0.99
Third managerial succession					2.51***	0.62	0.80	1.71**	-0.47	-0.43
Fourth managerial succession					-8.95	-21.72	-16.70	-9.58	-23.00	-19.11

TABLE 4 (continued)

1993

Haveman

875

Variables	Models									
	1	2	3	4	5	6	7	8	9	10
First presidential succession × age			-0.27**	-0.16					-0.24*	-0.14
Second presidential succession × age			-0.28*	-0.18					-0.25*	-0.18
Third presidential succession × age			-0.14	-0.08					-0.13	-0.10
Fourth presidential succession × age			-0.02	0.01					-0.04	-0.06
First managerial succession × age						-0.20*	-0.08		-0.09	0.01
Second managerial succession × age						-0.17	-0.11		-0.05	-0.02
Third managerial succession × age						0.11	0.12		0.18	0.21
Fourth managerial succession × age						-0.03	-0.04		-0.05	-0.01
Presidential duration										-0.58***
Managerial duration										-0.28*
χ^2	40.2	106.2	112.8	139.9	73.8	82.3	99.6	120.9	131.3	164.6
df	8	12	16	17	12	16	17	16	24	26

* There were 2,767 one-year spells, 243 organizations, and 56 organizational deaths.

* $p < .05$, two-tailed t tests** $p < .01$, two-tailed t tests*** $p < .001$, two-tailed t tests

fects early in the organizational life cycle. Model 4 adds the clock for duration since the most recent succession event. Consonant with Hypothesis 1, this parameter is negative and statistically significant, indicating that the disruptive impact of succession lessens as time passes. The effects of the succession-age interaction variables are rendered nonsignificant in this model as a result of multicollinearity.

Models 5 through 7 repeat this analysis for the succession of vice presidents, secretaries, treasurers, and general managers. These results are weaker than those for presidents. Managerial succession had mostly positive and significant effects ($\Delta\chi^2 = 33.6$, $\Delta df = 4$, $p < .001$). Three negative effects for the succession-age interactions, of which only one is significant, offer weak support for Hypothesis 2 ($\Delta\chi^2 = 8.5$, $\Delta df = 4$, $p < .08$). A strong, negative effect of duration since the most recent succession event supports Hypothesis 1. Again, the effects of the succession-age interaction variables are rendered nonsignificant in this model.

To gauge the strength of the effect of presidential succession relative to that of the succession of other managers, models 8 through 10 include both types of event. In model 8, the effects of presidential succession are positive and statistically significant, but the effects of other-managerial succession are less robust. Only two estimates are positive and statistically significant. However, the addition of the four variables indicating the succession of other managers significantly improves the fit to the data over a model including only presidential succession variables ($\Delta\chi^2 = 14.7$, $\Delta df = 4$, $p < .01$). Model 9 shows only two significant succession-age interactions, for the first and second successions of a company president. Finally, model 10 continues to show support for Hypothesis 1, with both duration clocks having negative and significant effects. In general, the effects of presidential succession are larger in magnitude and have higher levels of significance than the effects of the succession of vice presidents, treasurers, secretaries, and general managers. These results support Hypothesis 3. The exit of company presidents has greater impact on organizational failure than does the exit of other managers.

DISCUSSION AND CONCLUSIONS

This study investigated the relationship between managerial succession and organizational failure longitudinally and developed a model that incorporated the exit of chief executives and other managers and investigated variation in the effects of succession over time. It applied this model to a population of small organizations to control for one important contingency factor—organizational size. The findings presented here show a positive relationship between succession and mortality, consonant with the succession-crisis model (Carroll, 1984). Managerial succession was detrimental to the survival of early telephone companies. These effects diminished as the time elapsed since a succession increased, indicating that organizations that survive long enough can adapt to core changes (Amburgey et al., 1993).

There is weak evidence that succession has the greatest impact when it occurs early in the organizational life cycle, a finding consonant with previous studies (Carroll, 1984; Singh et al., 1986). Although all empirical evidence agrees on the heightened effect of succession in young organizations, studies have differed with respect to the direction of that effect. My results and Carroll's indicate that managerial succession disrupts internal operations and external relations, but Singh and colleagues' analysis indicates that CEO succession improves symbolic or instrumental fit to external relations. The difference between the studies may be the result of Singh and colleagues' assumption that the effects of change disappear immediately after it occurs, whereas I allowed for and found lingering effects for change. This difference may also be the result of industry-specific differences between telephone companies, newspapers, and voluntary organizations. Finally, I found that the effect of succession is stronger for presidents than for other managers, consonant with the expectation that the behavior of the most powerful individuals has the greatest effect on organizational outcomes (Finkelstein, 1992).

This study shows that researchers should distinguish between the immediate and the long-term effects of succession. The immediate effect is a substantial increase in the failure rate of organizations. However, as time passes, this effect is attenuated. If enough time passes, the net effect of succession can be beneficial. The total effect of succession is a multiplier of the rate of failure that can be calculated as $\exp[\beta_2 S_i(t) + \beta_4 D(t)]$. Looking at the impact of presidential succession only and building from model 4, I calculated the multiplier of the rate of failure for an organization that has experienced one succession event as 94.6 immediately after succession occurs. An organization that has experienced the exit of its first president is almost 100 times more likely to fail in the year following the succession than is a comparable organization that has had stable executive leadership. This multiplier drops to 49.0 the next year and declines to 1.3 five years after the succession event. When 6.9 years have passed, the failure rate of organizations that have experienced presidential exit equals that of organizations that have had the same presidents for their entire histories. For the succession of other managers, the multipliers are lower: 15.8, 9.8, and 1.5, for immediately after succession, 1 year, and 5 years, respectively. After 5.8 years have passed, the failure rate of firms experiencing managerial succession equals that of organizations with stable leadership. But all is not gloomy. Succession can prove beneficial if organizations survive long enough. After 6.9 years for presidential exit and 5.8 years for managerial exit, the failure rates of organizations that have experienced succession are lower than the failure rates of organizations with stable management.

The three succession-age interactions that achieved significance were for the first two presidential succession events and the first managerial succession event. The results of an analysis of the succession of first presidents only (not reported here) show a positive main effect, a negative effect for duration, and a negative age-succession interaction, indicating that the suc-

cession of a founding president early in the organizational life cycle is especially detrimental to an organization's survival chances. One explanation for these findings is that the first few succession experiences affect young organizations more severely than older organizations and that all organizations learn how to manage the succession process after they have been exposed to a few succession events. In other words, organizations develop formal routines to facilitate changes in leadership. Older organizations routinize succession, just as large bureaucracies do (Grusky, 1961), as they gain experience with this type of change.

One control variable, organizational growth, bears discussion. Growth here was a proxy for organizational performance. Growth has a consistently positive effect on the mortality rate, although this effect is not always significant. This finding indicates that rapidly growing organizations get into trouble and are less likely to survive than shrinking or stable organizations. In contrast, Barnett and Carroll (1987: Table 4) found no significant effect of growth on survival for mutual companies and a positive effect for commercial companies. These new results indicate a complicated relationship between growth, managerial succession, and survival.

Future research should extend the research presented here by controlling for other features of the succession context; for example, they might compare internal and external succession (Brown, 1982; Carroll, 1984; Gouldner, 1954; Reinganum, 1985; Virany et al., 1992). A second fruitful topic is the degree to which organizational structure moderates the succession effect. Are large, bureaucratic firms, in which the jobs of top managers are less idiosyncratic than they are in small firms (Miner, 1987), subject to the same effect, or do large organizations routinize succession, thereby limiting its impact (Grusky, 1961)? Analysis should be performed on organizations of varying sizes. A richer analysis might enable researchers to develop a contingency theory of managerial succession, predicting when succession will have beneficial, detrimental, or neutral effects.

Generalizing these results to large corporations is difficult because the firms studied here were small and often operated on a nonprofit basis; however, this analysis demonstrates that current models of succession apply to organizations other than large bureaucracies. Generalizing to entrepreneurial businesses, to family-run firms, and to small nonprofit organizations, which constitute the vast majority of the organizational community (Aldrich & Auster, 1986; Granovetter, 1984), is much easier. Like other small organizations, rural telephone companies had simple structures, with only a few distinct positions for operators, linemen, installers, and managers. As in family-run firms, many positions in rural telephone companies were filled by the relatives of owners, especially their wives and children (MacMeal, 1934). Like other newly established organizations, rural telephone companies faced the challenges of organizing new activities: developing internal systems and establishing relations with surrounding communities, customers, suppliers, and other telephone exchanges (MacMeal, 1934). Managerial succession proved disruptive to all these activities and imperiled rural tele-

phone companies; small, family-run, and entrepreneurial organizations face similar hazards following managerial succession.

REFERENCES

- Aldrich, H., & Auster, E. 1986. Even dwarfs started small: Liabilities of age and size and their strategic implications. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior*, vol. 8: 165–198. Greenwich, CT: JAI Press.
- Allen, M., Panian, S., & Lotz, R. 1979. Managerial succession and organizational performance: A recalcitrant problem revisited. *Administrative Science Quarterly*, 24: 167–180.
- Amburgey, T., Kelly, D., & Barnett, W. 1993. Resetting the clock: The dynamics of organizational change and failure. *Administrative Science Quarterly*, 38: 51–73.
- Barnett, W., & Carroll, G. 1987. Competition and mutualism among early telephone companies. *Administrative Science Quarterly*, 32: 400–421.
- Beatty, R., & Zajac, E. 1987. CEO change and firm performance in large corporations: Succession effects and manager effects. *Strategic Management Journal*, 8: 305–317.
- Birch, D. 1987. *Job creation in America*. New York: Free Press.
- Boeker, W. 1992. Power and managerial dismissal: Scapegoating at the top. *Administrative Science Quarterly*, 37: 400–421.
- Brock, G. 1981. *The telecommunications industry: The dynamics of market structure*. Cambridge, MA: Harvard University Press.
- Brown, M. 1982. Administrative succession and organizational performance: The succession effect. *Administrative Science Quarterly*, 27: 1–16.
- Calder, B. 1977. An attribution theory of leadership. In B. M. Staw & G. Salancik (Eds.), *New directions in organizational behavior*. 179–204. Chicago: St. Clair Press.
- Carroll, G. 1984. Dynamics of publisher succession in newspaper organizations. *Administrative Science Quarterly*, 29: 303–329.
- Cox, D. R., & Oakes, D. 1984. *Analysis of survival data*. London: Chapman and Hall.
- Eitzen, D., & Yetman, N. 1972. Managerial change, longevity, and organizational effectiveness. *Administrative Science Quarterly*, 17: 110–116.
- Finkelstein, S. 1992. Power in top management teams: Dimensions, measurement, and validation. *Academy of Management Journal*, 35: 505–538.
- Freeman, J., Carroll, G., & Hannan, M. 1983. The liability of newness: Age dependence in death rates. *American Sociological Review*, 48: 692–710.
- Gamson, W., & Scotch, N. 1964. Scapegoating in baseball. *American Journal of Sociology*, 70: 69–72.
- Gouldner, A. 1954. *Patterns of industrial bureaucracy*. New York: Free Press.
- Granovetter, M. 1984. Small is bountiful: Labor markets and establishment size. *American Sociological Review*, 49: 323–334.
- Grusky, O. 1961. Corporate size, bureaucratization, and managerial succession. *American Journal of Sociology*, 67: 261–269.
- Grusky, O. 1963. Managerial succession and organizational effectiveness. *American Journal of Sociology*, 69: 21–31.
- Grusky, O. 1964. Reply to scapegoating in baseball. *American Journal of Sociology*, 70: 72–76.
- Guest, R. 1962. Managerial succession in complex organizations. *American Journal of Sociology*, 68: 47–56.

- Hambrick, D., & Fukutomi, G. 1991. The seasons of a CEO's tenure. *Academy of Management Review*, 16: 719-742.
- Hannan, M., & Freeman, J. 1989. *Organizational ecology*. Cambridge, MA: Harvard University Press.
- Helmich, D. 1974. Organizational growth and succession patterns. *Academy of Management Journal*, 17: 771-775.
- Kanter, R. 1977. *Men and women of the corporation*. New York: Basic Books.
- Kimberly, J. 1976. Organizational size and the structuralist perspective: A review, critique, and proposal. *Administrative Science Quarterly*, 21: 571-597.
- Lieberson, S., & O'Connor, J. 1972. Leadership and organizational performance: A study of large corporations. *American Sociological Review*, 37: 117-130.
- MacMeal, H. 1934. *The story of independent telephony*. Chicago: Independent Pioneer Telephone Association.
- Meindl, J., & Ehrlich, S. 1987. Romance of leadership and the evaluation of organizational performance. *Academy of Management Journal*, 30: 91-109.
- Meindl, J., Ehrlich, S., & Dukerich, J. 1985. The romance of leadership. *Administrative Science Quarterly*, 30: 78-102.
- Miner, A. 1987. Idiosyncratic jobs in formalized organizations. *Administrative Science Quarterly*, 32: 327-351.
- Mintzberg, H. 1979. *The structuring of organizations*. Englewood Cliffs, NJ: Prentice-Hall.
- Pfeffer, J. 1981. Management as symbolic action: The creation and maintenance of organizational paradigms. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, vol. 3: 1-52. Greenwich, CT: JAI Press.
- Pfeffer, J., & Davis-Blake, A. 1986. Administrative succession and organizational performance: How administrator experience mediates the succession effect. *Academy of Management Journal*, 29: 72-83.
- Pfeffer, J., & Salancik, G. 1978. *The external control of organizations*. New York: Harper & Row.
- Preisendoerfer, P., & Voss, T. 1990. Organizational mortality of small firms: The effects of entrepreneurial age and human capital. *Organization Studies*, 11: 107-129.
- Puffer, S., & Weintrop, J. 1991. Corporate performance and CEO turnover: The role of performance expectations. *Administrative Science Quarterly*, 36: 1-19.
- Reinganum, M. 1985. The effect of executive succession on stockholder wealth. *Administrative Science Quarterly*, 30: 46-60.
- Salancik, G., & Pfeffer, J. 1977. Constraints on administrator discretion: The limited influence of mayors on city budgets. *Urban Affairs Quarterly*, 12: 475-498.
- Scott, W. 1992. *Organizations: Rational, natural, and open systems* (3rd ed.) Englewood Cliffs, NJ: Prentice-Hall.
- Singh, J., House, R., & Tucker, D. 1986. Organizational change and organizational mortality. *Administrative Science Quarterly*, 31: 587-611.
- Starbuck, W. 1985. Organizational growth and development. In J. March (Ed.), *Handbook of organizations*: 451-533. Chicago: Rand-McNally.
- Stinchcombe, A. 1968. *Constructing social theories*. Chicago: University of Chicago Press.
- Tuma, N. 1980. *Invoking RATE* (2d ed.). Menlo Park, CA: SRI International.

- Tuma, N., & Hannan, M. 1984. *Social dynamics: Models and methods*. Orlando, FL: Academic Press.
- Virany, B., Tushman, M., & Romanelli, E. 1992. Executive succession and organizational outcomes in turbulent environments: An organization learning approach. *Organization Science*, 3: 72-91.
- Zald, M. 1990. History, sociology, and theories of organization. In J. Jackson (Ed.), *Institutions in American society: Essays in market, political, and social organizations*. 81-108. Ann Arbor: University of Michigan Press.

Heather A. Haveman is an associate professor of business administration at the Fuqua School of Business, Duke University. She received her Ph.D. degree in organizational behavior and industrial relations from the University of California, Berkeley in 1990. Her research interests include the antecedents and consequences of change in the structure and activities of organizations, the evolving demography of organizational populations, and the consequences of organizational dynamics for career mobility.

FAIR PAY FOR FAIR PLAY: ESTIMATING PAY EQUITY IN PROFESSIONAL BASEBALL WITH DATA ENVELOPMENT ANALYSIS

LARRY W. HOWARD
University of Missouri

JANIS L. MILLER
Clemson University

Data envelopment analysis shows promise for generating objective estimates of pay equity. Applied to performance and salary data for 433 professional baseball players, data envelopment analysis identified objectively underpaid, equitably paid, and overpaid players. The output also identified relevant referents for each player and quantified the relative influences of referents and all variables.

Concepts of equity are fundamental to compensation management (Milkovich & Newman, 1987). Current techniques for estimating pay equity, however, pose serious problems. Job evaluations are subjective and political (Benson & Hornsby, 1988), and alternative methods often attain different estimates of a job's worth (Madigan & Hoover, 1986). Similarly, salary surveys can be distorted by companies' internal adjustments (Mahoney, 1975) and by differing job-pricing strategies across organizations (Lawler, 1990).

This article introduces data envelopment analysis as a technique for deriving an objective estimate of pay equity. A linear programming-based technique, data envelopment analysis produces an efficiency metric indicating the degree to which compensation is proportional to employee inputs. The output also identifies relevant referents for each employee considered and the composition of an equitable pay program for that individual.

DATA ENVELOPMENT ANALYSIS

Data envelopment analysis was originally proposed as a technique for evaluating the efficiency with which a group of operating units transforms inputs into outputs (Charnes, Cooper, & Rhodes, 1978). The most efficient units in the group define a "piecewise" linear production function; that is, input-output relationships are linear at each piece of the function between efficient units, although they are not necessarily linear across all efficient units. The function describes a hyperplane "efficient surface" in as many

We thank the two anonymous reviewers for their helpful comments on earlier versions of this article.

dimensions as there are inputs and outputs. Input-output relationships for the remaining units are then evaluated relative to this efficient surface.

The data envelopment analysis model is formulated as a fractional linear program. Conceptually speaking, the model searches the data to find the most efficient subset of other units to compare a subject unit against. The program produces a scalar efficiency measure for each unit by selecting weights (U_r and V_i) that maximize the ratio of a linear combination of the unit's outputs (O_{rp}) to a linear combination of its inputs (I_{ip}). This efficiency measure is constrained so that the weights selected must be feasible and cannot result in an efficiency ratio greater than that observed for the most efficient unit in the group. Mathematically, the model as applied to pay equity estimation appears as the following formulas:

$$\text{maximize: } \frac{\sum (U_r O_r)_p}{\sum (V_i I_i)_p} \quad (1)$$

$$\text{subject to: } \frac{\sum (U_r O_r)_o}{\sum (V_i I_i)_o} \leq 1, \quad (2)$$

where

U_r = the weight attached to output r (O_r),

V_i = the weight attached to input i (I_i),

p = the unit under analysis,

and

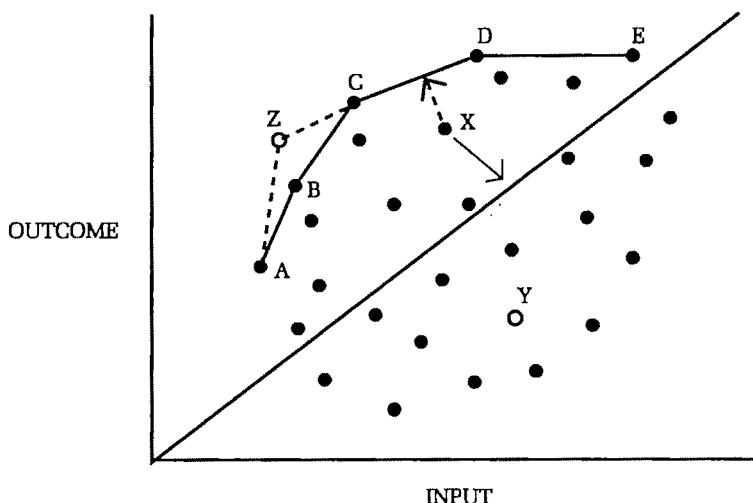
o = other units in the group.

Figure 1 illustrates how data envelopment analysis works in a pay equity context, identifying pay-efficient and underpaid, inefficient baseball players (heavy dots), each with one input and one outcome. Each player's ratio of outcome to input is compared with every other player's ratio. Five players (A–E) demonstrate extreme ratios. They can be thought of as posts on the plane of the graph. Between these posts, like a rubber band, the efficient frontier stretches around the periphery of players, forming a convex boundary. The efficient frontier is piecewise linear, since its segments are straight, but the entire line is merely monotonic.

Players on the frontier are efficient, maximizing the payout for their input. Efficient players are identified in the computer output with objective function values, or equity metrics, equal to 1.0. Players not on the frontier, such as player X, are not efficient—that is, underpaid—relative to the efficient players. Underpaid players are identified in the computer output with equity metrics less than 1.0. Furthermore, the size of an equity metric indicates the proximity of a player to the efficient frontier. For example, if player X's equity metric were .79, it would suggest that player X's outcome is 79 percent of what it would be at the frontier line segment C–D.

Linear programming guarantees that the equity metric is maximized for all observations. If the equity metric is .79, there are no other objective

FIGURE 1
Comparison of Data Envelopment Analysis' Extremal Frontier and
Least-Squares Regression Solutions



weights that could be attached to either inputs or outcomes to produce a larger equity metric. Consequently, if data envelopment analysis returns an equity metric less than 1.0, the player analyzed must be objectively underpaid.

Player X is bordered, or *enveloped*, by his nearest efficient neighbors, players C and D, who form the reference set for player X. Enveloping players are identified in the computer output by negative signs for their respective linear programming dual values, or *weights*. The weights indicate the influence each enveloping player has on describing an underpaid player as inefficient and are similar to piecewise regression coefficients (Neter, Wasserman, & Kutner, 1990: 370–374). Therefore, an efficient hypothetical *composite player* can be constructed by multiplying the observed inputs and outcomes for the reference set players by their respective weights and summing the products. For example, if the weights for players C and D were $-.75$ and $-.82$, respectively, an efficient composite player X would have input (I) equal to $.75I_C + .82I_D$ and outcome (O) equal to $.75O_C + .82O_D$.

Adding observations to the analysis set may or may not affect the efficient frontier. For example, if we were to add player Y to the lower right-hand portion of Figure 1, that player would be inefficient and have no effect on the efficient frontier. On the other hand, if we were to add player Z to the upper left-hand portion, above and to the left of player B, player Z would achieve an optimal ratio of converting his input into outcome. Player Z would stretch the rubber band, redefining the efficient frontier and causing player B to now be described as inefficient. Generally speaking, the more

observations (players) in an analysis set, the higher the probabilities that one or more will redefine the efficient frontier, increasing the number of inefficient members. Conversely, when more variables (inputs and outcomes) are analyzed, the efficient frontier becomes more like a sheet of rubber poked out in several directions. Therefore, the probabilities are higher that any given player will excel on at least one dimension, reaching the efficient frontier and reducing the number of inefficients. Banker, Charnes, Cooper, Swarts, and Thomas (1989) suggested that providing at least three observations per variable analyzed substantially stabilizes data envelopment analysis solutions.

Data envelopment analysis can also estimate overpayment inequity. However, only the players formerly described as efficient (i.e., equity metrics = 1.0) are included in the data analysis set. Also, the constraint requiring the metric not to exceed 1.0 is relaxed (Formula 2), but only for the player under analysis. Understanding what happens may be facilitated if we imagine the efficient frontier as the fabric of an opened umbrella, the supporting tips of the several spokes representing efficient players. Metaphorically speaking, when we calculate overpayment, we cut a hole in the fabric and allow one spoke to protrude. After taking a measure of the protrusion, the overpayment metric, we patch that hole and cut another for the next spoke, and so on. The overpayment metric appears in the computer output as the objective function value for this analysis.

The overpayment metric will equal the equity metric (1.0) only when a player is located directly on the plane connecting other efficient players. Any player who establishes a corner on the frontier by demonstrating a uniquely maximal outcome-input ratio will attain an overpayment metric greater than 1.0. The more that the metric is greater than 1.0, the higher is the probability that it indicates overpayment inequity.

It is the convention in data envelopment analysis to consider any unit achieving twice the efficiency of other efficient units as an outlier (Banker, 1989; Banker, Das, & Datar, 1989). That is, a metric larger than 2.0 suggests a significant difference in either the management or the technology of the unit. Therefore, we propose that overpayment metrics greater than 2.0 indicate candidates for overpayment inequity.

Data envelopment analysis may provide additional information not available from conventional regression methods (Seiford & Thrall, 1990). For instance, it provides a summary judgment on optimal efficiency that regression does not. This is because data envelopment analysis is an "extremal" approach, producing a maximizing or minimizing solution, whereas regression analysis is based on central tendencies, producing an average solution. The A-B-C-D-E line in Figure 1, for example, is an extremal frontier, stretching around the data. The straight solid line represents a least-squares regression solution. It is an average because it is fit through the center of the data and must pass through the means of all variables.

The dashed arrow from player X to the frontier suggests that player X is

inefficient when compared to players C and D, his most similar efficient neighbors. On the other hand, the solid arrow from player X to the slope of the regression solution suggests that player X might be efficient, inasmuch as he exceeds values predicted by the average. Data envelopment analysis has proven more accurate than regression in identifying efficient and inefficient units when the results of both are compared to independent efficiency audits (Charnes, Cooper, Divine, Ruefli, & Thomas, 1989).

Data envelopment analysis also clearly identifies the referents responsible for describing efficiency and quantifies their influence; regression analysis does not. Similarly, data envelopment analysis is more precise than regression in identifying and quantifying the variables influential in defining efficiency (Charnes et al., 1989) because it considers each observation separately, comparing it only to its most similar efficient neighbors. Regression analysis, however, compares each observation to a value predicted by the average behavior of all observations, both efficient and inefficient.

We are not proposing that the equity metric and overpayment metric derived from objective data are direct measures of perceived inequity. However, there is theoretical justification for proposing that they might represent the logical corollaries to perceived inequity as described by Adams (1963: 424). People perceive inequity, argued Adams, whenever they perceive that the ratios between the outcomes they have attained and their inputs do not equal the ratios for social referents. This argument represents the same logic that data envelopment analysis applies to objective data. The linear programming formulation of data envelopment analysis (Formulas 1 and 2) is very similar to the following perceptual-equity formulation (Adams, 1965):

$$\frac{\sum (P_r O_r)_p}{\sum (R_i I_i)_p} = \frac{\sum (P_r O_r)_o}{\sum (R_i I_i)_o}, \quad (3)$$

where

P_r = the perceptual weight attached to output r (O_r),

R_i = the perceptual weight attached to input i (I_i),

p = person,

and

o = other.

Also, empirical evidence suggests that when individuals form equity judgments, they tend to compare themselves with others higher in a relevant social structure, particularly to "standard setters" (Cowherd & Levine, 1992; Feldman & Ruble, 1981). The extremal basis of data envelopment analysis is consistent with identifying such available and relevant referents (Kulik & Ambrose, 1992). In addition, defining underpayment inequity with metrics less than 1.0 and identifying overpayment inequity with

metrics greater than 2.0 is conceptually similar to the threshold and tolerance effects found in equity theory research. That is, slight underpayment may produce perceptions of inequity, but only exaggerated overpayment seems to produce perceptions of inequity (Weick & Nessel, 1968). In summary, there is reason to believe that the objective estimates of pay equity provided by data envelopment analysis might correspond to perceptions of pay equity.

The remainder of this article reports a study of professional baseball players to demonstrate the potential of data envelopment analysis for objectively identifying (1) equitably and inequitably compensated players and (2) observations and variables most influential in describing equity.

METHODS

Data and Variables

This study analyzed the efficiency of transforming 29 performance inputs into a single outcome, salary, for 433 nonpitching professional baseball players from the 26 U.S. major league teams. Pitchers were not included because their performance criteria are essentially different from those of position players. We also excluded rookies because they had no prior performance records.

The 1990 edition of the *Baseball Register* (Siegel, 1990) provided data for the performance (input) variables for each of the players. Inputs included offensive and defensive statistics for both the 1989 season and the players' careers. Salary data were drawn from preseason newspaper reports listing base salaries and signing bonuses, prorated for the term of guaranteed contracts (Ward, 1990). Table 1 identifies the input variables analyzed. We also entered an individual's number of years as a major league professional in analyses and measured the salary outcome as 1990 salary in thousands of dollars. Players were also coded by position; the three outfield positions were combined, resulting in six analysis sets by position.

Fielding and batting averages were considered independent of their linear components. Part-whole collinearities, such as home runs and runs bat-

TABLE 1
Input Variables

Stolen bases	Home runs
Games played	Runs batted in
Official at-bats	Batting average
Runs scored	Put outs
Hits	Assists
Doubles	Errors*
Triples	Fielding average

* This variable was reverse-scored.

ted in, were likewise evaluated independently. In addition, to satisfy the assumption of monotonicity, we reverse-scored defensive errors by subtracting each player's errors from the maximum value for all players.

Analyses

Four analyses were conducted using the linear programming module of SAS-OR (SAS Institute Inc., 1989): One analysis each of underpayment and overpayment inequity for each of two groups of social referents, (1) players by position and (2) all nonpitching players in the data set. In the underpayment analyses, the data envelopment analysis determined a weight for each of the 29 performance inputs and for salary (outcome) so that the equity metric, computed as salary divided by the sum of weighted inputs, could not exceed 1.0 for any player in the analysis sets. An equity metric less than 1.0 objectively indicates underpayment inequity.

The overpayment analyses included only players achieving equity metrics equal to 1.0. Also, the constraint on the metric for the player under analysis was removed, so the overpayment metric had to assume a value equal to or greater than 1.0. An overpayment metric exceeding 2.0 objectively suggests candidates for overpayment inequity.

RESULTS

Table 2 shows the results of the equity analyses by analysis set. As expected, the analyses by positions consistently produced a smaller proportion of underpaid players than did the overall analysis, because the former groups were smaller. As previously noted, data envelopment analysis tends to find more inefficiencies as sample sizes increase, until there are at least three observations per variable. Among the position analyses, chi-square tests indicated that the outfielder analysis set included a significantly larger number of underpaid players ($\chi^2 = 33.7$, $p < .001$). This, too, is not surprising, since there were two-to-three times more outfielders than players in any other position. The analysis repeated without outfielders showed no other

TABLE 2
Underpaid, Equitably Paid, and Overpaid Players by Analysis Set^a

Position	N	Underpaid	Equitably Paid	Overpaid
Catcher	76	36	33	7
First base	51	18	24	9
Second base	50	21	22	7
Third base	52	19	24	9
Shortstop	47	14	21	12
Outfield	157	101	42	14
Total	433	209 (.74)	166 (1.28)	58 (4.47)
Overall	433	285 (.76)	122 (1.18)	26 (2.71)

^a The median equity metrics for each analysis set are in parentheses.

significant differences in the frequencies of underpayment across positions ($\chi^2 = 7.82, p < .45$).

It is interesting to note, however, that all 209 players identified as inequitably underpaid in the separate position analyses were among those identified as inequitably underpaid in the overall analysis. Furthermore, the rank correlation between the equity metrics derived from the position and overall analyses, respectively, was .92 ($p < .001$). This figure suggests that objectively underpaid players are underpaid regardless of the peer groups they are compared to. Similarly, all 26 players identified as overpaid in the overall analysis were among those overpaid in the position analyses.

There is also evidence to suggest a correspondence between the objective estimates of pay equity and player perceptions of pay equity. Before the 1990 season, 162 of the 173 eligible players filed for salary arbitration; our data set includes 90 filers of 94 who were eligible. Most of these negotiated contracts prior to final-offer, third-party arbitration. However, 15 of the players in our data set were so dissatisfied with their 1990 salary offers that they carried their salary demands to binding arbitration hearings (Chass, 1990). Seven lost their cases, apparently receiving salaries that they believed to be inequitable. The overall equity metrics for these players are .48, .49, .64, .80, .91, .92, and 2.82, figures indicating that six of the seven who saw themselves as inequitably underpaid were objectively undercompensated compared to all other nonpitching players. The players who won their cases in arbitration and apparently received salaries they felt they deserved had overall equity metrics of .95, .97, 1.07, 1.08, 1.21, 1.37, 1.70, and 2.24. According to a one-sided Mann-Whitney test, losers' equity metrics were significantly smaller than winners' ($T = 8, p < .01$). Although an imperfect arbitration process presents one possible explanation for these results, they also offer evidence of a correspondence between the objective estimate of equity derived from data envelopment analysis and perceived pay equity.

An important part of the computer output from data envelopment analysis identifies the particular reference set of comparator observations for all inequitably rewarded players. An equitably rewarded composite player can be constructed from those observations. This composite player is a linear combination of the comparator players' inputs, weighted by their respective linear programming dual values.

Table 3 shows the construction of a composite player for one inequitably compensated player who achieved an equity metric of .81. Four equitably paid players make up the reference set. To produce the composite, we cross-multiplied the observed values for those four players by their respective weights and summed the products. The analysis shows that the composite player would achieve the same (or higher) salary, even though the composite's performance was inferior in every category. This analysis provides information regarding outcome or input adjustments that might be necessary to bring an inequitably underpaid player's salary or inputs objectively in line with referents. In this case, the player would have to receive a

TABLE 3
Construction of Composite Player

Variables	Referent 1	Referent 2	Referent 3	Referent 4	Composite Player ^a	Underpaid Player
1989						
Stolen bases	1	0	25	3	1	< 5
Games played	20	117	134	141	38	< 142
Official at-bats	12	390	482	554	130	< 456
Runs scored	1	42	89	41	11	< 63
Hits	2	92	152	118	29	< 123
Doubles	0	20	34	18	5	< 24
Triples	0	1	4	0	0	< 2
Home runs	0	12	21	13	3	< 12
Runs batted in	0	41	79	57	14	< 46
Batting average	.167	.236	.315	.213	.099	< .270
Put outs	6	222	289	231	58	< 137
Assists	13	169	3	400	87	< 254
Errors	36	18	34	7	12	< 15
Fielding average	1.0	.956	.993	.956	.506	< .949
Career						
Stolen bases	1	8	337	20	10	< 12
Games played	40	799	1,134	493	147	< 211
Official at-bats	27	2,946	3,911	1,825	506	< 688
Runs scored	8	351	700	156	53	< 81
Hits	5	736	1,136	432	135	< 179
Doubles	0	147	210	68	21	< 33
Triples	0	13	42	4	1	< 6
Home runs	0	115	68	37	11	< 16
Runs batted in	0	418	385	198	56	< 68
Batting average	.185	.250	.290	.237	.109	< .260
Put outs	10	687	1,831	738	195	< 237
Assists	19	1,474	85	1,439	328	< 479
Errors	352	253	263	254	159	< 319
Fielding average	.967	.956	.965	.957	.496	< .955
Years	3	6	12	5	2	< 3
Salary	114	640	1,458	550	180	= 180

^a The four reference players (REF1-REF4) were identified by the output, and the weight assigned to each reference player was the dual value associated with the reference player, so the composite player (COMP) is constructed as follows: $COMP = (.27692)REF1 + (.02615)REF2 + (.01626)REF3 + (.19632)REF4$.

23 percent (1/.81) raise in pay to \$222,222 (\$180,000/.81) or decrease all inputs by 19 percent (1 - .81) to objectively restore equity.

DISCUSSION

Data envelopment analysis has been used to evaluate efficiency in production operations, hospital administration, schools, agriculture, and mass transit. Data envelopment analysis has also been applied to budgeting, commodity pricing, and rate-setting for Medicaid prescription drugs (for a bib-

liography, see Seiford [1990]). In this study, we extended data envelopment analysis to the domain of pay equity. The information that data envelopment analysis provides regarding objective estimates of pay equity may present significant opportunities for both practitioners and researchers.

For example, the output clearly identifies individuals who have an objective basis for perceiving underpayment inequity. Early identification of these individuals might enable managers to "proactively" adjust either compensation components or job input requirements, preventing perceptions of inequity. The output also quantifies the necessary adjustments. In contexts in which it would not be practical to substantially adjust pay, performance, or both (cf. Harder, 1992), individuals perceiving inequity could engage in alternative responses, including exit and political or dysfunctional activities. Identifying these people might facilitate the development of alternative legitimate vehicles for expressing and addressing inequities. The correspondence between the objective estimate of pay equity and perceptual measures of pay equity deserves further examination. Similarly, potential relationships between data envelopment analysis weights and cognitive weights assigned to input and outcome components suggest further research opportunities.

The objective estimate of overpayment also has practical implications. First, it suggests a ceiling that managers might target for compensation, eliminating compensation that is in excess of its ability to motivate and thus wasted (Becker & Huselid, 1992). Second, if it is the upper echelon of overpaid individuals who serve as social referents in others' fairness judgments (Cowherd & Levine, 1992), minimizing the pay differential across classes should also minimize perceptions of inequity. Subsequent research might explore the relationship between those referents identified by the computer output and those reported to serve as social comparators. The somewhat arbitrary convention of defining overpayment as two-times equitable payment also deserves further examination. The continuous nature of the equity and overpayment metrics, however, should enable researchers to better define inequity thresholds and tolerances.

Although data envelopment analysis provides some information that regression techniques cannot, it is perhaps best considered a complementary and supplementary approach. Indeed, two-stage analyses involving regressions on the equity metric can reveal relationships that might not surface in conventional regression analyses (Epstein & Henderson, 1989); two-stage analyses can also be used to test the effects of contextual variables, such as fan attendance. Similarly, regressing employee attributes on the equity metric might provide evidence related to the presence or absence of discrimination.

However, the data envelopment analysis protocol is not without limitations. Its primary limitation is the assumption that all relevant input and outcome variables are included for analysis. In this study, salary was the only outcome analyzed, whereas total compensation in baseball includes several other components (Hill & Spellman, 1983). Data for other compo-

nents are proprietary and unavailable. Nonetheless, lack of access to data on compensation components should not be a limitation in organizational settings, and a strength of data envelopment analysis is that multiple outcomes are both easily modeled and simultaneously evaluated. Likewise, other qualitative inputs, such as willingness to be a team player, might constitute additional compensable factors. Data envelopment analysis readily handles qualitative inputs as categorical variables in a way similar to how they are handled by regression. Also, where distinctions are binomial, the protocol for data envelopment analysis can be written in such a way that only other observations that have the same definition as a given observation constitute its analysis set (Banker & Morey, 1986).

There are other probabilistic considerations. In particular, sample sizes and the number of variables analyzed might affect results. As the number of observations increases, the number found efficient generally decreases. Adding observations to the peer groups simply makes it more likely that a superior comparator will be found. As the number of variables (inputs and outcomes) increases, the number of observations found efficient generally increases. Adding variables makes it more probable that an observation will gain a basis for efficiency. Consequently, analyses should include at least three observations per variable. Finally, data envelopment analysis is somewhat sensitive to grossly overpaid outliers, and in some cases reliability can be enhanced by removing those outliers from the analysis set. Nonetheless, given accurate measurement, data envelopment analysis does not fail to identify objective inequities when they exist.

Data envelopment analysis output provides useful information for decision makers regarding the format and levels of compensation appropriate for their organizations. Further, it enables them to make both consistent adjustments to maintain equitable programs and systematic and defensible specifications for planning future rewards. The solution provides a mechanism for evaluating compensation strategy as well as compensation administration. The algorithm can be written by anyone proficient with linear programming and linear programming software and easily used by others. Data envelopment analysis complements existing planning and evaluation techniques, providing an objective alternative method for estimating pay equity.

REFERENCES

- Adams, J. S. 1963. Toward an understanding of inequity. *Journal of Abnormal and Social Psychology*, 67: 422-436.
- Adams, J. S. 1965. Inequity in social exchange. In L. Berkowitz (Ed.), *Advances in experimental psychology*, vol. 2: 267-299. New York: Academic Press.
- Banker, R. D. 1989. Econometric estimation and data envelopment analysis. In J. L. Chan & J. M. Patton (Eds.), *Research in governmental and nonprofit accounting*, vol. 5: 231-243. Greenwich, CT: JAI Press.
- Banker, R. D., Charnes, A., Cooper, W. W., Swarts, J., & Thomas, D. A. 1989. An introduction to data envelopment analysis with some of its models and their uses. In J. L. Chan & J. M.

- Patton (Eds.), *Research in governmental and nonprofit accounting*, vol. 5: 125–163. Greenwich, CT: JAI Press.
- Banker, R. D., Das, S., & Datar, S. M. 1989. Analysis of cost variances for management control in hospitals. In J. L. Chan & J. M. Patton (Eds.), *Research in governmental and nonprofit accounting*, vol. 5: 289–291. Greenwich, CT: JAI Press.
- Banker, R. D., & Morey, R. C. 1986. The use of categorical variables in data envelopment analysis. *Management Science*, 32: 1613–1627.
- Becker, B. E., & Huselid, M. A. 1992. The incentive effects of tournament compensation systems. *Administrative Science Quarterly*, 37: 336–350.
- Benson, P. G., & Hornsby, J. S. 1988. The politics of pay: The use of influence tactics in job evaluation committees. *Group & Organization Studies*, 13(2): 208–224.
- Charnes, A., Cooper, W. W., Divine, D., Ruesli, T. W., & Thomas, D. 1989. Comparisons of DEA and existing ratio and regression systems for efficiency evaluations of regulated electric cooperatives in Texas. In J. L. Chan & J. M. Patton (Eds.), *Research in governmental and nonprofit accounting*, vol. 5: 187–210. Greenwich, CT: JAI Press.
- Charnes, A., Cooper, W. W., & Rhodes, E. 1978. Measuring the efficiency of decision making units. *European Journal of Operational Research*, 2: 429–444.
- Chass, M. 1990. 102 pct. raise to arbitration filers. *Sparting News*, March 5: 26.
- Cowherd, D. M., & Levine, D. I. 1992. Product quality and pay equity between lower-level employees and top management: An investigation of distributive justice theory. *Administrative Science Quarterly*, 37: 302–320.
- Epstein, M. K., & Henderson, J. C. 1989. Data envelopment analysis for managerial control and diagnosis. *Decision Sciences*, 20: 90–119.
- Feldman, N. S., & Ruble, D. N. 1981. Social comparison strategies: Dimensions offered and options taken. *Personality and Social Psychology Bulletin*, 7: 11–16.
- Harder, J. W. 1992. Play for pay: Effects of inequity in a pay-for-play context. *Administrative Science Quarterly*, 37: 321–335.
- Hill, J. R., & Spellman, W. 1983. Professional baseball: The reserve clause and salary structure. *Industrial Relations*, 22: 1–19.
- Kulik, C. T., & Ambrose, M. L. 1992. Personal and situational determinants of referent choice. *Academy of Management Review*, 17: 212–237.
- Lawler, E. E., III. 1990. *Strategic pay: Aligning organizational strategies and pay systems*. San Francisco: Jossey-Bass.
- Madigan, R. M., & Hoover, D. J. 1986. Effects of alternative job evaluation methods on decisions involving pay equity. *Academy of Management Journal*, 29: 84–100.
- Mahoney, T. A. 1975. Justice and equity: A recurring theme in compensation. *Personnel*, 52(5): 60–66.
- Milkovich, G. T., & Newman, J. 1987. *Compensation* (2d ed.). Plano, TX: Business Publications.
- Neter, J., Wasserman, W., & Kutner, M. H. 1990. *Applied linear statistical methods* (3d ed.). Homewood, IL: Irwin.
- SAS Institute Inc. 1989. *SAS/OR user's guide, version 6* (1st ed.). Cary, NC: SAS Institute Inc.
- Selford, L. M. 1990. *A bibliography of data envelopment analysis (1978–1990), Version 5.0*. Technical report, Department of Industrial Engineering, University of Massachusetts, Amherst.
- Selford, L. M., & Thrall, R. M. 1990. Recent developments in DEA: The mathematical programming approach to frontier estimation. *Journal of Econometrics*, 46: 7–38.

- Siegel, B. (Ed.). 1990. *Official baseball register*. St. Louis, MO: Sporting News.
- Ward, S. 1990. 1990 major league baseball salaries. *USA Today*, March 30: C4.
- Weick, K. E., & Nettet, B. 1968. Preferences among forms of equity. *Organizational Behavior and Human Performance*, 3: 400-416.

Larry W. Howard received his M.B.A. degree from Western Michigan University. He is a doctoral candidate in management at the University of Missouri. His research interests include organizational justice, organizational culture, compensation management, and political influence tactics.

Janis L. Miller received her Ph.D. degree in management from the University of Missouri. She is an assistant professor in the department of management at Clemson University, where she directs the Small Business Institute. Her research interests include application of quantitative methods and total quality management.

AN ASSESSMENT OF THE CONSTRUCT VALIDITY OF THREE JOB EVALUATION METHODS: A FIELD EXPERIMENT

JUDITH M. COLLINS

University of Arkansas at Little Rock

PAUL M. MUCHINSKY

University of North Carolina at Greensboro

Federal statutes recommend the analysis of four job attributes as measures of job worth, and the National Academy of Sciences recommends using one job evaluation method across classifications in an organization. The results of this construct validity study showed that the correctness of evaluations based on the four factors is questionable, as is the use of a single method across classifications.

The federal Equal Pay Act of 1963 stipulated that four attributes must be considered in the evaluation of the worth of a job: the skill, responsibility, and effort required for the job; and the working conditions associated with it. Although a number of studies have examined multiple methods of job evaluation, no reported research has assessed the construct validity of job evaluation methods specific to those four factors. Milkovich and Cogill (1984) noted it is disturbing that so little research effort has been devoted to assessing the reliability, accuracy, and equivalence of job evaluation methods. Schwab (1984) stated that the construct validity of job evaluation methods must be established before any inferences of job worth derived from the use of such methods are made. In a similar vein, Doverspike, Carlisi, Barrett, and Alexander stated, "Future research should also focus on the differential psychometric properties of the different methods of job evaluation" (1983: 482).

In general, the literature supports the reliability of job evaluation methods, but conflicting findings have emerged regarding their validity. Doverspike and colleagues (1983) and Fraser, Cronshaw, and Alexander (1984) determined there was high interrater reliability among evaluators using a single job evaluation instrument. Madigan (1985) examined the reliability, discriminant validity, and convergent validity of three job evaluation methods in the context of decisions about comparable worth pay classifications.

We gratefully acknowledge the assistance of the city officials who permitted us to conduct this study and thank the managers studied for their time and willingness to participate. We also wish to thank two anonymous reviewers for this journal for their useful comments and recommendations.

Madigan concluded that (1) factor (dimension) redundancy was a potential shortcoming of job evaluation measures, (2) evaluation methods differ in terms of measurement quality, and (3) classification decisions are likely to be method-dependent. Madigan's conclusions are particularly notable because of their possible implications for the determination of job worth.

Job worth has traditionally been determined by two processes. The first is an assessment of a job's contribution to the overall welfare of an organization. This assessment manifests itself in some form of job evaluation ranging from whole-job ranking methods to job-decompositional methods that differentially weight the primary components, or compensable factors, constituting the job. Such methods are designed to produce decisions representing a sense of equity within an organization. The second process is a comparison of the levels of compensation that other employers are paying for equivalent jobs. A consideration of this factor in the compensation decision is designed to produce decisions that represent a sense of equity external to the organization. However, this factor is particularly fallible when used in setting compensation rates because there is no uniform going rate for jobs, as wages can be influenced not only by such ecological parameters as regional cost-of-living differences, but also by where the organization wishes to position itself in a given market (Gerhart & Milkovich, 1992). Because of these constraints, a major avenue for advancing academic knowledge of job worth is the study of multiple methods of job evaluation. Such study can provide evidence of the construct validity of the factors organizations use to derive the worth of jobs. As Messick (1988) observed, an inductive summary of convergent and discriminant evidence provides a plausible basis for construct interpretation. In turn, this interpretation offers the opportunity for developing a theoretical basis to the construct under study. Without such a conceptual basis, it is unlikely that purely empirical studies of compensation can help better explain the construct of job worth.

A further concern is the use of the same or different job evaluation methods for different classifications of jobs. The absence in the literature of the validation of principles underlying job evaluation is especially noteworthy since, for example, the National Academy of Sciences has recommended the use of a single job evaluation method to assess the value of all jobs across classifications within an organization (Treiman & Hartmann, 1981).

Therefore, the present study examined three major issues: the extent to which three common job evaluation methods measure the worth of a job as prescribed by the U.S. Department of Labor in the Equal Pay Act of 1963; the extent to which convergent and discriminant evidence provide a plausible basis for construct interpretation; and the appropriateness of using the same methods across job classifications as recommended by the National Academy of Sciences.

METHODS

The study was conducted in a midwestern city with a population of 80,000. Thirty department managers and supervisors rated jobs with which

they were familiar. These raters were long-time employees of the city having extensive experience in their respective departments. Ten managers evaluated jobs in each of three classifications. Of the 30 managers, 25 were men. The average age of the managers was 41 years, and their average tenure with the city was 15 years.

Job Evaluation Methods

Of the several professionally accepted methods of job evaluation available today, three frequently used point methods were used in this study. The first was the Midwestern Industrial Management Association (MIMA) job evaluation system, which is composed of nine dimensions. The MIMA method has been used extensively in the private sector for several decades and has recently been refined for use in the public sector. The second was the Factor Evaluation System (FES), developed by the U.S. Civil Service Commission, Bureau of Policies and Standards, and consists of nine dimensions. The FES method has been used primarily in the public sector, and it is the principal job evaluation system of the federal government. The third was a 13-dimension job evaluation system designed in 1984 for the state of Iowa by the consulting firm of Arthur Young and Company (AYC). It is based upon the assessment of job factors in the service sector, both public and private.

Each job evaluation method purportedly measures the compensable factors of skill, responsibility, effort, and working conditions associated with a job. However, the methods do not specify which of their dimensions assess each factor. Accordingly, a panel of expert judges assigned these dimensions to the four factors. Four of the judges held doctoral degrees in industrial-organizational psychology, and one held a master's degree in industrial relations. We instructed the judges to indicate which factor each dimension of each job evaluation method measured. The judges used the factor definitions established by the U.S. Department of Labor (1971) to make their independent decisions.

We specified a 60 percent or greater level of agreement as necessary before we would use a given dimension to represent a particular factor, a criterion of agreement used in other judgment research (e.g., Harai & Zedeck, 1973). One dimension of the FES job evaluation method was eliminated from further consideration because it did not meet the 60 percent agreement criterion. One dimension of the AYC job evaluation method was eliminated because it measured the supervisory components of a job, which were deemed inappropriate for the jobs studied. Of the 29 dimensions rated by the judges, 27 produced levels of agreement of 80 percent or greater, and 29 met the 60 percent agreement criterion.

Procedures

The managers evaluated a wide variety of jobs falling under three classifications: blue-collar, clerical, and professional-technical. Ten managers evaluated the jobs in each of the three classifications. Each job was evaluated

by four managers, and within each classification every manager evaluated two jobs. Each of the 30 managers independently evaluated his or her two jobs with each of the three job evaluation methods. We explained the methods to the managers, who made the evaluations at their job sites during the normal work day. For each job, we summed the point value ratings the managers assigned to the four factors to obtain a total job worth score.

Statistical Analyses

Estimates of interrater reliability were obtained from correlations of total job evaluation scores by each of the four managers on each of the three job evaluation methods. The estimate of reliability is based on Cronbach's coefficient alpha, in which $\bar{r}$ is the mean interrater correlation among k raters (Strahan, 1980).¹

Multitrait-multimethod analysis was used to make estimates of convergent validity, discriminant validity, method bias, and rater bias. In this study the methods were the three job evaluation methods, and the traits were the four compensable factors.

Analysis of variance (ANOVA) was used to test for the significance of convergent and discriminant validity and for bias effects. The ANOVA was an unbalanced, split-plot, within-repeated-measures design. In this design, classification (blue-collar, clerical, and professional-technical), method (MIMA, FES, and AYC), and traits (skill, responsibility, effort, and working conditions) were cross-classified, and job and manager identities were nested within classifications. Each job was rated by four managers, but the four managers were not the same for each job; thus, jobs and managers were confounded within a given classification. This confounding produces a lack of compound symmetry in the data matrix that cannot be avoided but can be corrected for. It was, therefore, necessary to evaluate the observed F -ratio, based on the repeated measures, against a new critical value that assumes the presence of maximal heterogeneity. Thus, we used the Greenhouse-Geisser correction to reduce the degrees of freedom (Keppel, 1982: 468–471).

ANOVA was used to assess construct validity as follows: (1) we evaluated classification and job effects for evidence of convergent validity; (2) we assessed the presence of trait-by-classification and trait-by-job-interaction effects for evidence of discriminant validity; (3) we tested for method bias by evaluating the interactions of method by classification and method by job; and (4) we examined the method-by-manager interaction effect for evidence of rater bias.

Finally, we averaged the job evaluation ratings provided by the four managers per method and rank-ordered the five jobs per method within each classification. The degree of agreement among the ranks was determined by the Kendall coefficient of concordance (W). We compared the rank ordering of the five jobs per classification produced by each of the three methods to

¹ Correlations and the grouping of factors are available from the authors.

to .75 for the AYC instrument. The FES method produced greater differentiation among the factors, with correlations ranging from .11 to .75.

The three sets of circled validity diagonals show the correlations among the three methods in assessing the four factors. The average of the 12 validity coefficients was .75, reflecting a high degree of convergent validity. The highest convergent validity coefficient was .89 (working conditions), and the lowest convergent validity coefficient was .59 (effort). This finding seems plausible, given that the working conditions factor assesses aspects of a job that occur at fairly low levels of abstraction; "exposure to adverse heat or cold on a job" is an example. It is possible that the meaning of this factor is clearer than those of the other three, resulting in greater convergence in its assessment. There were other differences in the degrees of convergence across the four factors. The greatest overall convergence was for the working conditions factor ($\bar{r} = .86$), and the lowest mean convergence was for the skill factor ($\bar{r} = .66$). It may be debatable whether skill is any more abstract in its meaning than responsibility ($\bar{r} = .76$), effort ($\bar{r} = .70$), or working conditions, but the assessment of skill appears to be the most method-specific.

Discriminant validity, the extent to which the four traits order jobs differently, is assessed by examining the correlations of traits across methods (as shown by the dashed-line heterotrait-heteromethod triangles in Figure 1). The correlation between the same two job traits by different methods should be higher than the correlation of that trait with other traits within a given job evaluation method. The examination of trait intercorrelations in the multitrait-multimethod matrix showed evidence for the independence of traits, and significant effects were found to support discriminant validity, as is discussed subsequently.

In summary, an examination of the matrix showed evidence for convergent and discriminant validity, the criteria that establish construct validity, using three job evaluation methods that each measured the traits of skill, responsibility, and effort and the working conditions associated with each job evaluated.

Results of the ANOVA of the multitrait-multimethod data revealed statistically significant degrees of convergent validity for the job evaluation methods within the classifications ($p < .001$) and within the jobs ($p < .001$). Table 1 presents results.

The findings relating to discriminant validity were also statistically significant, with greater discrimination of the factors occurring between classifications ($p < .001$) than between jobs within each classification ($p < .025$). This finding means that the four factors discriminated jobs across classes and, to a lesser extent, jobs within classes. The method-by-classification interaction effect was nonsignificant, indicating that all three methods similarly measured jobs within classifications. But the statistically significant method-by-job interaction ($p < .025$) was evidence of method bias. This finding means that, within a classification, jobs were differently ordered depending on the method used. We found evidence of rater bias in the statistically significant ($p < .001$) method-by-manager interaction effect, in-

TABLE 1
Results of Analysis of Variance of Multitrait-Multimethod Data

Source	Construct	df	Greenhouse- Geisser df^a	Mean Square	F	p
Classification	Convergent validity	2		102.72	193.81	<.001
Manager		24		1.78	3.35	<.005
Job	Convergent validity	9		6.80	12.83	<.001
Manager $\times$ Job		21		0.53	2.40	<.01
Instrument		2		0.00		
Instrument $\times$ classification	Method bias	4	3	0.24	1.80	
Instrument $\times$ manager	Rater bias	48	46	0.44	3.38	<.001
Instrument $\times$ Job	Method bias	18	17	0.32	2.48	<.025
Instrument $\times$ manager $\times$ Job		42	41	0.13	1.00	
Factor		3		0.00		
Factor $\times$ classification	Discriminant validity	6	1	13.68	62.18	<.001
Factor $\times$ manager		72	17	0.55	2.50	
Factor $\times$ Job	Discriminant validity	27	6	0.78	3.54	<.025
Factor $\times$ manager $\times$ Job		63	15	0.22	1.69	
Instrument $\times$ factor		6		0.00		
Instrument $\times$ factor $\times$ classification		12	1	0.27	2.07	
Instrument $\times$ factor $\times$ manager		144	23	0.25	1.92	
Instrument $\times$ factor $\times$ Job		54	8	0.24	1.84	
Instrument $\times$ factor $\times$ manager $\times$ Job		126	20	0.13		

^a Greenhouse-Geisser adjusted degrees of freedom for an unbalanced design.

dicating that managers assessed the worth of jobs differently with one method than with the other methods.

Table 2 shows the results of using the three job evaluation methods to order the five jobs within each classification on the basis of their assessed worth. The ranking of jobs was performed by evaluating the worth of that job according to each of the job evaluation methods. Table 2 also shows the rank currently given to the worth of each job by the city in its evaluation of these jobs for pay purposes. For the blue-collar classification ($W = 0.70, p < .001$), the three methods converged in matching the first- and fifth-ranked jobs, but the jobs ranked second, third, and fourth were misordered across the methods. For the clerical classification ($W = 0.90, p < .001$), the three methods converged in their evaluation of the fifth-ranked job and disagreed slightly regarding the other four jobs, and no method matched the city's ordering of the jobs. For the professional-technical classification ($W = 1.00, p < .001$), there was perfect agreement across the three methods in assessing the value of the five jobs, but the first- and second-ranked jobs were inverted in comparison to the city's ranking of the jobs. Therefore, the overall evaluation of the five jobs within each classification by the three methods showed a high degree of similarity. However, there was total agreement among methods for only the professional-technical job classification. The differences in rankings, despite evidence for convergent validity, may be the result of differ-

TABLE 2
Average Rank Orders of Jobs

Classifications	City	Job Evaluation Methods		
		Midwestern Industrial Management Association	Factor Evaluation System	Arthur Young and Company
Blue-collar jobs				
1st class lineworker	1	1	1	1
Apprentice lineworker	2	3	2	3
Operator	3	2	4	4
Assistant operator	4	4	3	2
Coal equipment operator	5	5	5	5
Clerical jobs				
Library assistant II	1	2	2	1
Library assistant I	2	4	4	3
Secretary I	3	1	1	2
Senior clerk typist	4	3	3	4
Clerk typist	5	5	5	5
Professional-technical jobs				
Detective	1	2	2	2
Police officer	2	1	1	1
Senior engineering technician	3	3	3	3
Engineering technician	4	4	4	4
Dispatcher	5	5	5	5

ences in the ordinal data, which produced the rankings, and the interval data, from which we estimated convergent validity. Therefore, although these findings may attest to the consistency of judgments of total job worth value across the methods, and thus to the methods' reliability, they may not necessarily reflect the correctness, or validity, of the methods. Perhaps the seeming contradiction is a matter of a distinction between statistical and practical significance.

A finding emerged in the professional-technical classification rankings that points to the potential deceptiveness of interpreting findings illustrating reliability as indicating validity in job evaluation. The city ranked the job of detective first and the job of police officer second, but the three job evaluation instruments examined in this study inverted those ranks. An inspection of the raw scores for the factors comprising the respective job evaluation methods revealed that the job of police officer was rated higher than that of detective on the skill factors of complexity of tasks, personal contacts, and purposes of contacts. The responsibility factors that were rated higher for police officer were complexity of duties, effect of work errors, confidentiality, supervisory control, and scope of tasks. Mental and physical demands were also rated higher for police officer, as were working conditions and hazards. It appears that the compensable factors assessed by the job evaluation methods were sensitive to the differences between the two jobs, but not in the direction that was expected.

Further, although we observed evidence for convergent and discriminant validity, there were differences in the sensitivity of methods to the other two classifications, as evidenced by the differential rankings.

Our observations bring to mind the fundamental question raised by Schwab (1985) as to whether the four suggested factors of the Equal Pay Act of 1963 are truly the attributes that define the worth of a job. The fact that the methods were in agreement for two of the jobs, but in the wrong direction, and the differential rankings across classifications, lead us to conclude there is uniform criterion deficiency or contamination, or both (Brogden & Taylor, 1950), in the job evaluation methods' assessment of job worth. Job worth may be far more situationally defined than researchers have realized. If job worth is relative, estimates of true and error variance, the development of a theory of job worth, and pronouncements of what constitutes a fair wage are all problematic, challenging current measurement, perceptual, and conceptual perspectives. If job worth is as variable as the going rate, it is unlikely any correct level of compensation for a job exists. Finally, the results of this research suggest that caution be exercised in using the same job evaluation method across classifications.

Further research is needed to examine the effects of differences in the numbers of dimensions associated with each factor and the numbers of factors. These differences and other issues may explain the dissimilarity we saw in convergence across factors. Finally, Gerhart and Milkovich (1992) noted that, although the object of job evaluation is to aid in the development of pay structures, research has not yet examined how job levels and pay differences among them are determined.

REFERENCES

- Brogden, H. E., & Taylor, E. K. 1950. The theory and classification of criterion bias. *Educational and Psychological Measurement*, 10: 159-186.
- Doverspike, D., Carlisi, A. M., Barrett, G. V., & Alexander, R. A. 1983. Generalizability analysis of a point-method job evaluation instrument. *Journal of Applied Psychology*, 68: 476-483.
- Fraser, S. L., Cronshaw, S. F., & Alexander, R. A. 1984. Generalizability analysis of a point-method job evaluation instrument: A field study. *Journal of Applied Psychology*, 69: 643-647.
- Gerhart, B., & Milkovich, G. T. 1992. Employee compensation: Research and practice. In M. D. Dunnette & L. M. Hough (Eds.), *Handbook of industrial and organizational psychology* (2d ed.), vol. 3: 481-569. Palo Alto, CA: Consulting Psychologists Press.
- Harai, O., & Zedeck, S. 1973. Development of behaviorally anchored scales for the evaluation of faculty teaching. *Journal of Applied Psychology*, 53: 261-265.
- Keppel, G. 1982. *Design and analysis*. Englewood Cliffs, NJ: Prentice-Hall.
- Madigan, R. M. 1985. Comparable worth judgments: A measurement properties analysis. *Journal of Applied Psychology*, 70: 137-147.
- Messick, S. 1988. The once and future issues of validity: Assessing the meaning and consequences of measurement. In H. Wainer & H. Braun (Eds.), *Test validity*: 33-45. Hillsdale, NJ: Erlbaum.
- Milkovich, G. T., & Cogill, C. J. 1984. Measurement as an issue in analysis and evaluation of jobs. In M. L. Rock (Ed.), *Handbook of wage and salary administration*: 1-14. New York: McGraw-Hill.
- Schwab, D. P. 1984. Job evaluation and pay setting: Concepts and practices. In E. R. Livernash (Ed.), *Comparable worth: Issues and alternatives*: 49-77. Washington, DC: Equal Employment Advisory Council.
- Schwab, D. P. 1985. Job evaluation research and research needs. In H. I. Hartmann (Ed.), *Comparable worth: New directions for research*: 37-52. Washington, DC: National Academy Press.
- Strahan, R. F. 1980. More on averaging judges' ratings: Determining the most reliable composite. *Journal of Consulting and Clinical Psychology*, 48: 587-589.
- Treiman, D. J., & Hartmann, H. I. 1981. *Women, work, and wages*. Washington, DC: National Academy Press.
- U.S. Department of Labor. 1971. *Equal pay for equal work under the Fair Labor Standards Act*. Washington, DC: U.S. Government Printing Office.

Judith M. Collins is an assistant professor of management at the University of Arkansas at Little Rock. She received her Ph.D. degree from Iowa State University. Current research topics include personnel selection issues such as suppressor effects in testing; neural network analysis of workplace behavior; personality, bio-data, and prediction; white-collar crime and prediction; and white-collar crime and gender differences. Her research of quality management work teams focuses on personality and the prediction of performance, absenteeism, and turnover.

Paul M. Muchinsky is the Joseph M. Bryan Distinguished Professor of Business at the Joseph M. Bryan School of Business and Economics, University of North Carolina at Greensboro. He is interested in a wide range of research topics within the field of human resources management.

SPECIAL RESEARCH FORUM CALL FOR PAPERS: INNOVATIVE APPROACHES TO INTERCULTURAL/INTERNATIONAL MANAGEMENT RESEARCH

The Academy of Management Journal is pleased to announce a call for a special research forum on Innovative Approaches to Intercultural/International Management Research. Guest co-editors for the forum will be Christopher Earley and Harbir Singh.

The globalization of management, organizations, and industrial systems has enhanced the role of international issues in business and management. Greater international competition and increasing spread of a firm's activities across borders have helped diffuse the once clear distinction between national and international issues. This change is reflected in part by the increasing research on globalization of markets and manufacturing, differences in cultural orientations between countries, and international strategies for building and exploiting competitive advantage. Scholars conduct this research using highly varied methodologies, ranging from laboratory experiments and large-scale field surveys to sophisticated analyses of the interconnections between country characteristics and firm performance. However, this growing and important field of inquiry needs the development and use of research paradigms and methodologies that capitalize on the unique aspects of international issues (as opposed to the application of paradigms and methods developed within a single culture or nation). Thus, new paradigms are needed in which the specific attributes of diverse cultural or national groupings are incorporated into the theoretical model, along with a methodology that capitalizes on these features.

One of the purposes of this special research forum is to synthesize and extend knowledge regarding the conduct of international and intercultural research. Such research typically involves the analysis of practices of various groups or collectives across national boundaries (as opposed to contrasts of cultures that vary across particular organizations, but within a common societal culture). Thus, we seek to encourage innovative research that enhances understanding of the theoretical and empirical role of culture and national origin in management phenomena. As a result, the forum will showcase management research that will serve as a guide to future study of intercultural and international management.

Beyond intercultural issues, understanding the conduct and performance of firms engaged in international competition is also important. National institutions and social conditions have a significant role in evolution of firms and in the development of their key strategic resources. National patterns in firm strategies may persist even as financial, product, and labor markets continue towards globalization. The long-run implications of such differences in firms and in sources of competitive advantage need to be understood.

The ideal paper for this forum might take a number of diverse forms. For example, research focusing on the relation of cultural values such as the concept of face and its relation to the provision of feedback in a performance appraisal context would be appropriate. Likewise, research focusing on the cultural, organizational, and/or strategic reasons for differences in risk-seeking behavior by organizational members or subunits in an international context would also be appropriate. Other examples may include the analysis of diversification and vertical integration patterns of multinational firms (including the role of alliances), examination of country patterns in entry strategy, intercultural differences in organizational practices (e.g., human resource management), intercultural differences in management of innovation, and the design and strategic management of multinational corporations. Our primary interest is to encourage submissions from all Academy divisions and diverse disciplines that provide innovative ways of addressing international management interests.

In preparing manuscripts, authors should follow standard requirements specified in AMJ's "Style Guide for Authors." Cover letters should request that papers be considered for this special research forum. Five copies should be sent to Angelo DeNisi, Associate Editor, Academy of Management Journal, Rutgers University. Papers must be received no later than September 1, 1993. All submissions will be blind reviewed in accord with AMJ's normal review process and criteria. Prospective contributors desiring further information may contact Chris Earley at (714) 856-6921, or Harbir Singh at (215) 898-7722.

SPECIAL RESEARCH FORUM CALL FOR PAPERS: INTRA- AND INTERORGANIZATIONAL COOPERATION AND COORDINATION

The Academy of Management Journal is pleased to announce a call for papers for a special research forum on Intra- and Interorganizational Cooperation and Coordination. Guest co-editors for the forum will be Susan Ashford, Stephen Carroll, and Ken G. Smith.

Management theory and research have relied heavily on the concept of "competition" to explain virtually all aspects of successful management. From ideas on how to gain advantage over rivals in strategic management, to designing compensation packages for enhancing individual performance in human resource management, the notions of "winning" and "individualism" are central and highly valued. Indeed, this reliance is so widespread, it is rarely questioned. However, for a number of complex reasons (e.g., the decline in U.S. competitiveness, increased globalization, the rise of the European Community, and the persuasive influence of Asian management practices), it is time to reconsider this perspective.

Therefore, theory-testing papers are requested that focus on various aspects of coordination and cooperation at all levels of organizational functioning. This can include cooperation and coordination among organizations, among units within organizations, and among individuals within groups. Although research and theory on these issues is relatively sparse in the management literature, there is a large literature in the supporting disciplines of economics, social psychology, sociology, and political science from which management scholars can draw.

The ultimate goal of this special research forum is to improve our understanding of the role and value of cooperation and coordination, and how it can be achieved, both within and between organizations. Thus, the topics considered should seek to advance our knowledge of cooperation/coordination and/or demonstrate new facets of the subject and their applicability. Submissions that integrate across micro and macro areas are particularly encouraged.

This research might include topics such as the alternative forms of cooperation/coordination, the psychological or relational base on which cooperation is built, elements that facilitate and impede cooperation, and organizational consequences of cooperation. More specific examples that would fit the cooperation/coordination domain include research that explains the ideal compensation package for enhancing harmony between work groups or individuals, studies on how to build and enhance trust between individuals, groups, or organizations, or studies that identify how managers can achieve coordination and cooperation among competing business units in domestic and international settings. Studies might also focus on the various forms of cooperation, from trade associations and formal alliances at the macro level, to job design and project team structure at the micro level. These illustrations are suggested only to spark creativity, not to constrain the types of issues addressed.

In preparing manuscripts, authors should follow standard requirements specified in AMJ's "Style Guide for Authors." Cover letters should request that papers be considered for this special issue. Five copies should be sent to Angelo DeNisi, Associate Editor, Academy of Management Journal, Rutgers University. Papers must be received no later than September 1, 1993. All submissions will be blind reviewed in accord with AMJ's normal review process and criteria. Prospective contributors desiring further information may contact Susan Ashford at (313) 763-1091, Stephen Carroll at (301) 405-2239, or Ken G. Smith at (301) 405-2250.

ORGANIZATIONAL COMMUNICATION AND MANAGEMENT

A Global Perspective

Andrzej K. Kozminski
and

Donald P. Cushman, editors

A volume in the
SUNY series in
Human Communication Processes
Donald P. Cushman and
Ted J. Smith III, editors
and

A volume in the SUNY series in
International Management
Andrzej K. Kozminski,
Patricia Sanders, and
Sarah Sanderson King, editors

SUNY Press • c/o CUP Services
PO Box 6525 • Ithaca, NY 14851
1-800-666-2211
Please add \$3 shipping and
handling. New York State residents,
please add 8% sales tax.
VISA, MasterCard,
American Express accepted.

"The role of communication, in general, and high speed management, in particular, in the new global economy is of particular importance to world politicians and business people if they are to compete effectively in the world marketplace of the next few decades. The significance of the new communication technologies in these developments, with their lasting impact on both the public and private sectors, is particularly noteworthy. This book provides such perspectives, and goes beyond the usual limited view of single authorship books in this area."

— Richard J. Dieker
Western Michigan University

232 pages
\$17.95 paperback
ISBN 0-7914-1306-3

State University of New York Press

THE BEST IN THE BUSINESS

“A truly revolutionary book in the field of management...Sayles writes with dignity about managing as an art, rooted deeply in action—in making things happen, getting real things done—based on a profound understanding of what is being managed. Read this book.”

—**Henry Mintzberg**, McGill University

THE WORKING LEADER

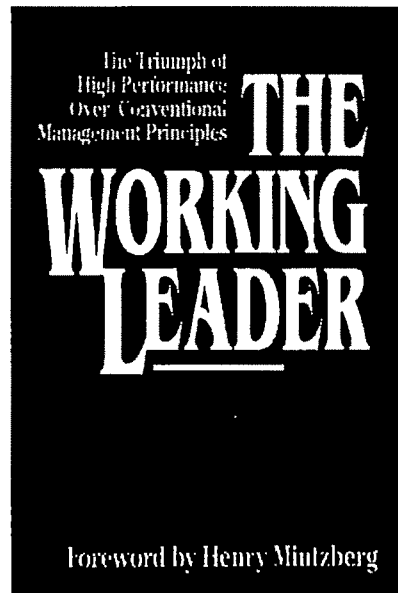
The Triumph of High Performance Over Conventional Management Principles

Leonard R. Sayles,
Center for Creative Leadership

Sayles argues that managers today—schooled to oversee fixed, almost unvarying routines—are unprepared to manage the conflicts in modern work-flow relationships. Rather than assuming the role of “strategist” or “planner,” he asserts, the modern line manager must become a “working leader,” managing work-flow relationships on the boundaries between jobs, functions, and departments, making things “work” through trade-offs with superiors, peers, and subordinates.

“Leonard Sayles describes the successful manager as the involved manager who seeks ways to do things better. No room for the aloof planner, the reactive problem-solver, the quick-fix junkie. I believe he is correct.”

—**Thomas I. Storrs**, Retired
Chairman, NationsBank



1993 0-02-927755-8 \$24.95

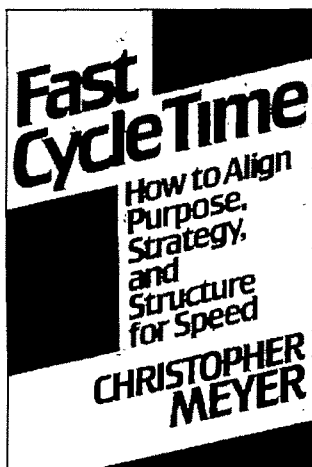
“This is a book to be read, reread, savored, and digested. It is a major contribution to the scholarship and practical literature on leadership.”

—**J. Ronald Fox**,
Harvard University

“Thought provoking...This book guarantees to activate the minds of caring leaders. A look into the future of American management style.”

—**Robert E. Frazer**, former
Chairman, Dayton Power and Light

Proud Sponsors of The Academy of Management's 1993 Annual Meeting



FAST CYCLE TIME

How to Align Purpose, Strategy, and Structure for Speed

Christopher Meyer,
Strategic Alignment Group

Foreword by **Peter M. Senge**

"Ford recently implemented a 25% reduction in our product development time to market.... the fundamentals cited in this book were critical to our success. His short lists of 'musts' tells it all."

—**Ken K. Kohrs**, VP, Car Product Development,
Ford North American Automotive Operations

1993 0-02-921181-6 \$29.95

QUALITY IS PERSONAL

**A Foundation for
Total Quality Management**

Harry V. Roberts,

University of Chicago, and

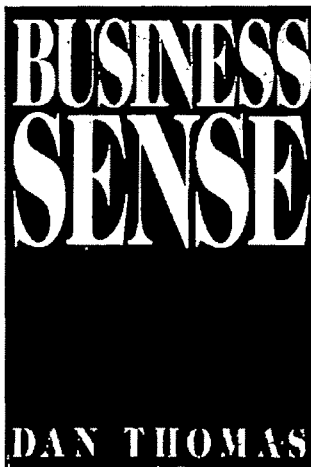
Bernard F. Sergesketter, *AT&T*

"The single most powerful concept to leverage the personal leadership of the quality process since the Malcolm Baldrige National Quality Award..."

—From the Foreword by

Robert W. Galvin, Chairman of the
Executive Committee, Motorola, Inc.

1993 0-02-926625-4 \$19.95 *paper*
0-02-926626-2 \$29.95 *cloth*



BUSINESS SENSE

**Exercising Management's
Five Freedoms**

Dan Thomas,

Founder and President, FOCUS

"This is not a coffee table book. It's loaded with practical advice about how to build and maintain a successful business. Dan Thomas' five freedoms will help you meet the most important challenge in today's business environment—change."

—**Lewis E. Platt**, President and CEO,
Hewlett-Packard Company

1993 0-02-932444-0 \$24.95

MARKETING PLACES

**Attracting Investment,
Industry and Tourism to
Cities, States, and Nations**

Philip Kotler, Donald Haider,
and **Irving Rein**, all
Northwestern University

"This book not only forecasts the future, but also serves as a blueprint for those places that want to have a profitable future. It's well-written, well-documented and a must read for the place marketing manager."

—**Al Ries**, Chairman,
Trout & Ries Marketing Strategists

1993 0-02-917596-8 \$35.00



THE FREE PRESS

A Division of Macmillan, Inc./A Maxwell Macmillan Company
866 Third Avenue, New York, NY 10022

FOR CREDIT CARD ORDERS, CALL TOLL-FREE 1-800-323-7445



THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY DEPARTMENT OF MANAGEMENT

The Hong Kong University of Science and Technology was established in April 1988 and is funded by the Hong Kong Government. Its mission is to extend educational opportunity, to contribute to the territory's economic and social well-being, and to promote research, development, and entrepreneurship in the Asia-Pacific region. The University draws top-quality students from the competitive Hong Kong education system. It offers all levels of degrees into an economy in which the demand outstrips the supply of qualified people. While students are expected to be bilingual, the medium of instruction is English.

The School of Business and Management is being developed in partnership with the Anderson Graduate School of Management, UCLA. It presently is on the fast track of growth, increasing from 50 faculty in 1992/93 to 90 in 1993/94 and will grow to 226 by the end of the decade. We are looking for well qualified people with a Ph.D. (or nearing completion) to help us build a program with a global view and a focus on the Asia-Pacific Region.

SALARIES

The University offers competitive salaries and teaching loads (three four-credit courses per year). Annual salaries range from US\$44,460 to US\$98,608. Salaries are under review for a cost of living increase effective April 1, 1993.

POSITIONS AVAILABLE

Applications and nominations are now invited for all ranks in the following areas of interest in the Department of Management:

Human Resources Management	Organizational Behaviour & Theory
International Business	Quantitative Techniques & Methods
Management	Statistics & Decision Theory
Management Science	Strategy & Policy
Operations Management	

CONDITIONS OF SERVICE

Generous fringe benefits including medical and dental benefits, annual leave, children's education allowances and air passages, where applicable, are provided. Housing or private tenancy allowance where applicable is also provided at a charge of 7.5% of salary. The initial appointment will generally be on a three-year contract which is renewable subject to mutual agreement. A gratuity of an amount equal to 25% of the total basic salary drawn will be payable upon successful completion of contract. It is the intention of the University to introduce a retirement scheme and arrangements will be made for eligible staff to join the scheme if established. Approved sabbatical leave will be at full salary.

APPLICATIONS

Applications/Nominations indicating the Department of Management and/or area(s) of interest together with a curriculum vitae and the names and addresses of four referees should be sent by air mail to:

Director of Personnel
Hong Kong University of Science and Technology
Clear Water Bay
Kowloon, Hong Kong

Further particulars can be obtained from the Director of Personnel (Fax: (852) 358-0700) or by contacting Dr. T.R. Jefferson, Department of Management, through E-mail: MNTJEFF@USTHK.BITNET. Applications in response to earlier advertisements will automatically be reviewed and such candidates need not re-apply. The search will continue until suitable appointments are made.

Groupe HEC

POSITION ANNOUNCEMENT

The Strategic Management Department of HEC is announcing the opening of a faculty position at the assistant professor or associate professor level. HEC is the leading business school in France and one of the top schools in Europe. HEC is a founding member of the Community of European Management Schools (CEMS) which organizes student and faculty exchanges between top business schools in the twelve EEC countries. HEC also participates in student exchange programs with leading North American universities. The 100 full time faculty members of HEC include colleagues with both European and North American doctorates.

There are four main teaching programs at HEC :

- the HEC "Grande Ecole" program for young students with very high potential; this program leads to a "Master in Management" degree,
- the ISA-MBA program ; ISA is a member of the European MBA association
- a doctoral program
- an executive education center (1992 turnover was close to US \$ 10 million).

Courses in all these programs are taught both in French and English.

The Strategic Management Department of HEC is looking for applications from candidates with an Industrial Organization or Strategy background and strong research capability. Fluency in French would be appreciated but is by no means a pre-requisite.

Compensation levels and research funding are similar to US levels. Applicants should send their CV, sample publications or working papers, a statement of research interests and the names of three references to :

Professor Pierre DUSSAUGE
Strategic Management Department
HEC
78351 JOUY-EN-JOSAS
France

GRADUATE SCHOOL OF BUSINESS ADMINISTRATION

Associate Professor in Management (Tenurable)

The appointee will preferably have strengths in strategic management and he/she will provide leadership in management within the MBA Program and teach postgraduate units in advanced management and contribute to other management courses as required. A major activity of the appointee will be to conduct research in management. Other responsibilities will include supervising research activities of postgraduate students.

Candidates for this senior post will be expected to have extensive experience in teaching and research at a university level. It would be desirable if the individual has background and experience in management in, or consultation to, the private sector as well. In addition, candidates will be expected to have a PhD in a relevant

discipline. Candidates will have a demonstrated ability to initiate and carry through team and collaborative research and to foster ties with external bodies.

Informal enquiries may be directed to Professor Wayne Thomas, Director, Graduate School of Business Administration, telephone 61 67 73 3541.

Salary: \$A60,475 to \$A66,625 pa (Level D)

Closing Date: 1 September, 1993

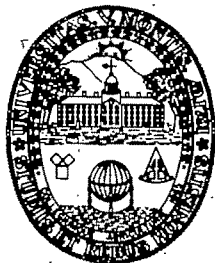
Position No.: 481

Applications should be addressed to the Director, Personnel Services, University of New England-Armidale, Armidale, N.S.W. 2351, Australia, telephone 61 67 73 2678 and should include the names, addresses, telephone, facsimile number/email address of three referees and should state the above position number.

UNE
ARMIDALE

Equal Opportunity and a Smoke Free Environment are University Policies

The University of Vermont SEARCH FOR DEAN School of Business Administration



*Nominations or letters of interest
including a resumé should be sent to:*

John N. Evans, Ph.D.
Chair, Search Committee
The University of Vermont
A-132 Living/Learning
Center
Burlington, VT 05405

The University of Vermont seeks applications and nominations for the position of the Dean of the School of Business Administration. The School was established in 1981 and has grown to more than 25 faculty with over 900 business students in its undergraduate and graduate programs. A department in the School offers a graduate program in public administration. The School is an integral component of the University which has an enrollment of more than 10,000 students. It is located in Burlington on the shores of beautiful Lake Champlain with easy access to Montreal and other Northeast centers of business.

The School is diverse, dynamic and willing to explore and implement new ideas. The University and State are leaders in international business, health care delivery and policy as well as environmental issues. The Dean will be responsible for developing undergraduate, graduate and research programs designed to place the School and its graduates in leadership positions in the business community. The Dean will play an active role in developing strong relationships within the University as well as with the business community and government.

The successful candidate must have outstanding leadership qualities, demonstrated experience in development and implementation of new programs and a commitment to scholastic achievement. The candidate must demonstrate an understanding of the needs of both the academic and business sectors with demonstrated direct experience in either of these areas. Experience in public affairs and fund raising is desirable.

Consideration will be given until the position is filled. Formal review will commence on September 1, 1993, and the expectation is to fill the position within 9 months. The University of Vermont is an Affirmative Action employer. Members of underrepresented groups are encouraged to apply.

The Academy of Management



JOURNAL

Articles

Social Construction of Communication Technology

Janet Fulk

Effects of Continuance, Affective, and Moral Commitment on the Withdrawal Process: An Evaluation of Eight Structural Equation Models

Stephen J. Jaros, John M. Jermier, Jerry W. Koehler, and Terry Sincich

Organizational Demography in Japanese Firms: Group Heterogeneity, Individual Dissimilarity, and Top Management Team Turnover

Margarethe F. Wiersema and Allan Bird

Resource Allocation as an Outcropping of Strategic Consistency: Performance Implications

Jeffrey S. Harrison, Ernest H. Hall, Jr., and Rajendra Nargundkar

Understanding Strategic Change: The Contribution of Archetypes

Royston Greenwood and C. R. Hinings

Research Notes

Toward an Organizational Behavior of Contract Laborers: Their Psychological Involvement and Effects on Employee Co-workers

Jane L. Pearce

Validity of an Honesty Test in Predicting Theft Among Convenience Store Employees

H. John Bernardin and Donna K. Cooke

Some Tests of Self-interest and Group-value Models of Procedural Justice: Evidence from an Organizational Appeal Procedure

Donald E. Conlon

Developer-User Interaction and User Satisfaction in Internal Technology Transfer

Dorothy Leonard-Barton and Deepak K. Sinha

Organizational Commitment and Turnover: A Meta-analysis

Aaron Cohen

ACADEMY OF MANAGEMENT

BOARD OF GOVERNORS

PRESIDENT	Greg R. Oldham, <i>University of Illinois, Urbana-Champaign</i>
PRESIDENT-ELECT & COORDINATOR OF PROFESSIONAL DIVISIONS	Mary Ann Von Glinow, <i>Florida International University</i>
VICE PRESIDENT & PROGRAM CHAIRPERSON	Richard T. Mowday, <i>University of Oregon</i>
SECRETARY-TREASURER & BUSINESS MANAGER	Ken Cooper, <i>Ohio Northern University</i>
PAST PRESIDENT	Donald C. Hambrick, <i>Columbia University</i>
EDITOR, ACADEMY OF MANAGEMENT EXECUTIVE	John F. (Jack) Veiga, <i>University of Connecticut</i>
EDITOR, ACADEMY OF MANAGEMENT JOURNAL	Michael A. Hitt, <i>Texas A&M University</i>
EDITOR, ACADEMY OF MANAGEMENT REVIEW	Richard J. Klimoski, <i>Ohio State University</i>
REPRESENTATIVES-AT-LARGE	Richard M. Hodgetts, <i>Florida International University</i>
	David B. Jemison, <i>University of Texas, Austin</i>
	Joanne Martin, <i>Stanford University</i>
	Janet P. Near, <i>Indiana University</i>
	Claudia Bird Schoonhoven, <i>Dartmouth College</i>
	William H. Starbuck, <i>New York University</i>
	Anne Tsui, <i>University of California at Irvine</i>

CHAIRPERSONS OF PROFESSIONAL DIVISIONS

BUSINESS POLICY & STRATEGY	Irene M. Duhaime, <i>Memphis State University</i>
CAREERS	Suzyn Ornstein, <i>Suffolk University</i>
CONFLICT MANAGEMENT	Keith Murnighan, <i>University of British Columbia</i>
ENTREPRENEURSHIP	Harold P. Welsch, <i>DePaul University</i>
HEALTH CARE ADMINISTRATION	Bruce Fried, <i>University of North Carolina</i>
HUMAN RESOURCES	M. Susan Taylor, <i>University of Maryland</i>
INTERNATIONAL MANAGEMENT	Richard Moxon, <i>University of Washington</i>
MANAGEMENT EDUCATION & DEVELOPMENT	Helen LaVan, <i>DePaul University</i>
MANAGEMENT HISTORY	John R. Hook, <i>Mount St. Mary's College</i>
MANAGERIAL CONSULTATION	Marilyn E. Harris, <i>Central Michigan University</i>
ORGANIZATION & MANAGEMENT THEORY	Claudia Bird Schoonhoven, <i>Dartmouth College</i>
ORGANIZATION DEVELOPMENT & CHANGE	Richard W. Woodman, <i>Texas A&M University</i>
ORGANIZATIONAL BEHAVIOR	Susan E. Jackson, <i>New York University</i>
ORGANIZATIONAL COMMUNICATION & INFORMATION SYSTEMS	Wesley C. King, <i>Miami University</i>
PRODUCTION/OPERATIONS MANAGEMENT	David M. Dills, <i>University of Waterloo</i>
PUBLIC & NONPROFIT SECTOR	Paul Nutt, <i>Ohio State University</i>
RESEARCH METHODS	Ralph A. Alexander, <i>University of Akron</i>
SOCIAL ISSUES IN MANAGEMENT	Richard E. Wokutch, <i>Virginia Tech</i>
TECHNOLOGY & INNOVATION MANAGEMENT	Robert T. Keller, <i>University of Houston</i>
WOMEN IN MANAGEMENT	Judith Hunt, <i>East Carolina University</i>

CHAIRPERSON OF THE PROFESSIONAL INTEREST GROUP

MANAGERIAL & ORGANIZATIONAL COGNITION	C. Marlana Fiol, <i>University of Colorado, Denver</i>
--	--

OTHER OPERATIONS

ACADEMY HISTORIAN & ARCHIVIST	Charles D. Wrege, <i>Cornell University</i>
ACADEMY NEWSLETTER	Bernard Keys, <i>Georgia Southern University</i>
ADVERTISING DIRECTOR	Donna L. Wiley, <i>California State University, Hayward</i>
PROCEEDINGS	Dorothy Perrin Moore, <i>The Citadel</i>
DIRECTOR OF COMPUTER SERVICES	Lee G. Caldwell, <i>Novell, Inc.</i>
DIRECTOR OF INTERNATIONAL PROGRAMS	Carolyn R. Dexter, <i>Pennsylvania State University, Harrisburg</i>
DIRECTOR OF MEMBERSHIP	William J. Helsler, <i>Newport News Shipbuilding</i>
DIRECTOR OF MEDIA RELATIONS	Francis J. Marra, <i>Ithaca College</i>
DIRECTOR OF PLACEMENT	McRae C. Banks, <i>Mississippi State University</i>
DIRECTOR OF PUBLISHER RELATIONS	Kenneth R. Thompson, <i>DePaul University</i>
SIGMA IOTA EPSILON, DIRECTOR	
STUDENT DIVISION	Paul L. Wilkens, <i>Florida State University</i>

Academy of Management JOURNAL

- EDITOR** Michael A. Hitt, Texas A&M University
- ASSOCIATE EDITOR** Angelo S. DeNisi, Rutgers University
- CONSULTING EDITORS** Susan J. Ashford, University of Michigan
Jane E. Dutton, University of Michigan
Alan D. Meyer, University of Oregon
- EDITORIAL BOARD** Everett E. Adam, Jr., University of Missouri, Columbia
Phillip Anderson, Cornell University
David B. Balkin, University of Colorado
Jean M. Bartunek, Boston College
Thomas S. Bateman, University of North Carolina
Philip Bobko, Rutgers University
Warren Boeker, Columbia University
Philip Bromiley, University of Minnesota
Jennifer A. Chatman, Northwestern University
Edward J. Conlon, University of Notre Dame
David A. Cowan, Miami University
Richard A. D'Aveni, Dartmouth College
Gregory G. Dess, University of Texas, Arlington
Robert Drazin, Emory University
Janet M. Dukerich, University of Texas
P. Christopher Earley, University of California at Irvine
Kathleen M. Eisenhardt, Stanford University
John E. Ettlie, University of Michigan
Gerald R. Ferris, University of Illinois at Urbana-Champaign
Sydney Finkelstein, University of Southern California
Howard Garland, University of Delaware
Connie J. G. Gersick, University of California at Los Angeles
Jennifer M. George, Texas A&M University
Luis Gomez-Mejia, Arizona State University
Ricky W. Griffin, Texas A&M University
Barbara A. Gutek, University of Arizona
Charles W. L. Hill, University of Washington
John R. Hollenbeck, Michigan State University
Robert E. Hoskisson, Texas A&M University
Barbara W. Keats, Arizona State University
Steven J. Kobrin, University of Pennsylvania
Rita D. Kosnik, Trinity University
Barbara S. Lawrence, University of California at Los Angeles
Thomas W. Lee, University of Washington
Alfred A. Marcus, University of Minnesota
Frances J. Milliken, New York University
Debra L. Nelson, Oklahoma State University
Gregory B. Northcraft, University of Arizona
Richard Osborn, Wayne State University
Sara L. Rynes, University of Iowa
Vida Scarpello, Georgia State University
Claudia B. Schoonhoven, San Jose State University
David M. Schweiger, University of South Carolina
Peter Sherer, University of Pennsylvania
Stephen M. Shortell, Northwestern University
Ken G. Smith, University of Maryland
Linda K. Trevino, Pennsylvania State University
Anne S. Tsui, University of California at Irvine
James P. Walsh, University of Michigan
Stuart A. Youngblood, Texas Christian University
- BUSINESS MANAGER** Ken Cooper, Ohio Northern University
- ADVERTISING DIRECTOR** Donna Wiley, California State University, Hayward
- COPY EDITOR** Persephone Doliner, Ithaca, New York
- INDEX EDITOR** Margaret A. White, Oklahoma State University
- PRODUCTION EDITOR** Steven Gomes, Mahopac, New York

INFORMATION FOR CONTRIBUTORS

The *Academy of Management Journal* publishes articles in fields of interest to members of the Academy of Management. These fields of interest are reflected in the divisions and interest groups listed on the inside front cover of the *Journal*.

AMJ publishes only original, empirical research as articles or research notes. The *Journal* does not publish purely theoretical articles; these are published by the *Academy of Management Review*. Papers that are primarily applied in focus and that have managers as an intended audience should be submitted to the *Academy of Management Executive*.

In its articles, the *Journal* seeks to publish research that develops, tests, or advances management theory and practice. Articles should have a well-articulated and strong theoretical foundation. All types of empirical methods—quantitative, qualitative, or combinations—are acceptable. Exploratory survey research lacking a strong theoretical foundation, methodological studies, replications or extensions of past research, and commentaries with new empirical content are also of interest for publication as research notes if they make an important contribution to knowledge relevant to management.

Articles and research notes should be written so they are understandable and interesting to all members of the Academy. The contributions of specialized research to general management theory and practice should be made evident. Specialized argot and jargon should be translated into terminology in general use within the fields of management. Articles should also be written as concisely as possible without sacrificing meaningfulness or clarity of presentation. To save space, tables should be combined and data should be presented in the text wherever possible.

Manuscripts submitted for publication as articles should not ordinarily exceed 30 double-spaced typewritten pages, including tables. Manuscripts submitted as research notes should not exceed 15 double-spaced typewritten pages, including tables. Everything in submitted manuscripts, including tables, should be typed in double-spaced format on one side of the page. Manuscripts prepared on computers should be printed on letter-quality printers or, if other printers are used, in double-strike or enhanced print.

Manuscripts are considered for publication with the understanding that their contents have not been published and are not under consideration elsewhere. Manuscripts should be prepared in accordance with the AMJ "Style Guide for Authors," which is published in the February issue and is also available from the editor. Contributors should submit five copies of their papers, retaining the original for their files. The *Journal* does not return manuscripts unless requested to do so.

Decisions regarding publication of submitted manuscripts are based on the recommendation of members of the Editorial Board or other qualified reviewers. All articles and research notes published in the *Journal* are subject to a blind review process. Obvious self-citations that make known the author's identity should be avoided whenever possible. Reviewers evaluate manuscripts on their significance to the field, conceptual adequacy, technical adequacy, appropriateness of content, and clarity of presentation. Reviewers' comments are made available to authors.

Submissions should be sent to Angelo S. DeNisi, Associate Editor, *Academy of Management Journal*, Institute for Management and Industrial Relations, Rockefeller Road—Kilmer Campus, Rutgers University, New Brunswick, NJ, 08903-5062.

Academy of Management JOURNAL

CONTENTS

Volume 36, Number 5, October 1993

From the Editor	917
Social Construction of Communication Technology Janet Fulk	921
Effects of Continuance, Affective, and Moral Commitment on the Withdrawal Process: An Evaluation of Eight Structural Equation Models Stephen J. Jaros, John M. Jermier, Jerry W. Koehler, and Terry Sincich	951
Organizational Demography in Japanese Firms: Group Heterogeneity, Individual Dissimilarity, and Top Management Team Turnover Margarethe F. Wiersema and Allan Bird	996
Resource Allocation as an Outcropping of Strategic Consistency: Performance Implications Jeffrey S. Harrison, Ernest H. Hall, Jr., and Rajendra Nargundkar ..	1026
Understanding Strategic Change: The Contribution of Archetypes Royston Greenwood and C. R. Hinings	1052

RESEARCH NOTES

Toward an Organizational Behavior of Contract Laborers: Their Psychological Involvement and Effects on Employee Co-workers Jone L. Pearce	1082
Validity of an Honesty Test in Predicting Theft Among Convenience Store Employees H. John Bernardin and Donna K. Cooke	1097

Some Tests of Self-interest and Group-value Models of Procedural Justice: Evidence from an Organizational Appeal Procedure Donald E. Conlon	1109
Developer-User Interaction and User Satisfaction in Internal Technology Transfer Dorothy Leonard-Barton and Deepak K. Sinha.....	1125
Organizational Commitment and Turnover: A Meta-analysis Aaron Cohen	1140

NEW SUBMISSIONS

New submissions to the *AMJ* should be sent to:

Angelo S. DeNisi, Associate Editor
Academy of Management Journal
Institute for Management and Industrial Relations
Rockefeller Road—Kilmer Campus
Rutgers University
New Brunswick, NJ 08903-5062

Michael A. Hitt will continue to handle papers under revision through
December 1993.

The *Academy of Management Journal* (ISSN 0001-4273) is published by the Academy of Management six times a year in February, April, June, August, October, and December. The address of the office of publication is Academy of Management, Ohio Northern University, P.O. Box 209, 300 South Union St., Ada, OH 45810.

Subscription rates for *AMJ* only: in U.S., Mexico, and Canada, \$65 for one year, \$123.50 for two years, \$175.50 for three years. Rates for overseas: \$75 for one year, \$142.50 for two years, \$213.75 for three years. All payable in U.S. dollars. Subscriptions and orders for back issues should be sent to the Business Manager, Ken Cooper, Ohio Northern University, P.O. Box 209, 300 South Union St., Ada, OH 45810. For membership information, call the Academy of Management business office, (419) 772-1953, fax (419) 772-1954.

Manuscripts and other material of an editorial nature should be sent to Angelo S. DeNisi, *Academy of Management Journal*, Institute for Management and Industrial Relations, Rockefeller Road—Kilmer Campus, Rutgers University, New Brunswick, NJ 08903-5062.

Copies of articles published in the *Journal* may be made for instructional, noncommercial use. The Academy of Management does not require prior clearance and makes no charge for this permission.

Inquiries related to advertising should be addressed to Donna Wiley, California State University, Department of Management and Finance, Hayward, CA 94542-3069, (510) 881-3964.

Printed in the United States. Typesetting, presswork, binding, and mailing by The Sheridan Press, Hanover, PA.

Academy of Management Journal, Publication No. 900920.

Second class postage paid at Ada; OH; and additional mailing offices.

POSTMASTER—Send address changes to *Academy of Management Journal*, Ohio Northern University, P.O. Box 209, 300 South Union St., Ada, OH 45810.

ISSN, 0001-4273

FROM THE EDITOR

1992 Outstanding *AMJ* Article

For the third year, I have had the pleasure of working with an excellent committee to select the outstanding article published in *AMJ* the previous year. As in previous years, the committee was composed of highly talented and dedicated colleagues who reviewed the excellent research conducted by colleagues in our field and published in *AMJ*. The committee to select the outstanding article published in the 1992 volume of *AMJ* was composed of Janet Dukerich (University of Texas at Austin), Jerry Ferris (University of Illinois), Janet Near (Indiana University), Ken Smith (University of Maryland), and Ray Zammuto (University of Colorado at Denver). Jerry Ferris served as the chairperson of this committee. As in past years, the task of this committee was difficult because there were many excellent articles and considerable diversity in the research topics. Therefore, it was difficult to select one outstanding article from the many high-quality research pieces published in *AMJ*. However, this group of dedicated scholars read all of the articles published in the 1992 volume and, after a thorough process, selected one to receive the award. We formally recognized the authors of this article at our annual Academy of Management meetings in August of this year. I also want to take this opportunity to congratulate the authors of the outstanding article published in the 1992 volume (pp. 921–955):

Luis R. Gomez-Mejia and David B. Balkin

“Determinants of Faculty Pay: An Agency Theory Perspective”

Congratulations, Luis and David, on an outstanding article and for the contributions it makes to management theory and practice. It is an excellent piece of work. Members of the committee suggested that it was an interesting and innovative article with a strong theoretical perspective and impressive methodological rigor. As a result, it provides an example of theory-driven empirical research that makes important contributions to the field of management in general, but also adds value to our knowledge of compensation. In addition, the article addresses an important aspect of the sociology of our profession, the role of research and teaching in management faculty rewards. If you have not had the opportunity to read this excellent piece of work, the committee and I recommend it to you.

I also want to thank the committee members for their hard work, dedication, and efficiency with which they accomplished their task. Thank you Janet, Jerry, Janet, Ken, and Ray. In addition, I congratulate all of the authors whose work was published in the 1992 volume of *AMJ*. There are many excellent articles and the committee experienced difficulty in selecting only one for this award.

AMJ Statistics

It is tradition with AMJ to provide the statistics on submissions, revisions, acceptances, and review times on an annual basis. Therefore, below are the statistics for AMJ during the period of July 15, 1992, through July 14, 1993.

Submissions Received from July 15, 1992, Through July 14, 1993

	Number	Percent of Total	Average Review Time (days)
New submissions			
Rejects with review	322	56.39%	58.79
Returned without review	32	5.61	2.56
Under revision	135	23.64	61.70
Withdrawn	4	00.70	
Under review	78	13.66	
Totals	571	100.00	59.65 days overall average (exclusive of rejects without review)
Revisions received			
Accepts	57	28.22	20.18
Rejects with review	34	16.83	63.44
Under revision	83	41.09	51.88
Withdrawn	0	00.00	
Under review	28	13.86	
Totals	202	100.00	43.78 days overall average

As you will note from the table above, we received a total of 571 new manuscript submissions during the 12-month period noted. This represents a 24.5 percent increase in new manuscript submissions over the previous 12-month period. Although there may be many reasons for this increased submission rate, I attribute it to the increased number of issues, which reduced the time to publication after acceptance, and to the new special research forums implemented. Also, AMJ is a highly attractive outlet for management scholars, with many high-quality manuscripts submitted for potential publication in AMJ.

During the 12-month period, we accepted 57 manuscripts and have a number of manuscripts undergoing further revision at our request. I expect a good number of these will be eventually accepted for publication in AMJ.

As noted above, the demand for publication in AMJ remains high and, in fact, has increased significantly in the most recent annual period. The average review time suggests that authors receive feedback on their manuscripts in an efficient time period (between seven and eight weeks from initial submission). Although our research continues to be more interdisciplinary with many manuscripts representing multiple subdisciplines within

management, I have attempted to categorize the submissions during the three years that I have been receiving new manuscript submissions. The greatest number of manuscripts received focused on topics in organizational behavior (23%), business policy and strategy (18%), organization and management theory (11%), and personnel and human resources (10%). Furthermore, I received manuscripts representing topics in all but one of the 21 divisions and interest groups of the Academy. Thus, we continue to receive manuscripts on a broad and diverse set of research topics.

In total, counting new submissions and revisions, we processed well over 700 manuscripts in the 12 months from July 15, 1992, through July 14, 1993. In total, during my editorship, we received 1,498 new manuscript submissions. I conclude that the demand for publication in *AMJ* is high and the *Journal* is alive and well.

Concluding Remarks

The next issue of *AMJ* represents the sixth in 1993, the first time we have published six issues in one year. Also, the December 1993 issue entails publication of our first Special Research Forums. In that issue, we will also recognize the many ad hoc reviewers who served *AMJ* during 1993.

We continue to welcome the submission of your scholarly empirical research in management. The number of subscribers for the *Journal* guarantees broad dissemination of the scholarly research, and thus we continue to have a strong following and readership. As a result, *AMJ* continues to represent an excellent outlet for disseminating cutting-edge management research in the United States and throughout the world.

Michael A. Hitt

PAST EDITORS

Paul M. Dauten, Jr., <i>University of Illinois</i>	1958–60
Dalton E. McFarland, <i>Michigan State University</i>	1961–63
Paul J. Gordon, <i>Indiana University</i>	1964–66
Stanley C. Vance, <i>University of Oregon</i>	1967–69
William G. Scott, <i>University of Washington</i>	1970–72
John B. Miner, <i>Georgia State University</i>	1973–75
Larry L. Cummings, <i>University of Wisconsin–Madison</i>	1976–78
John W. Slocum, Jr., <i>Southern Methodist University</i>	1979–81
Thomas A. Mahoney, <i>Vanderbilt University</i>	1982–84
Janice M. Beyer, <i>New York University</i>	1985–87
Richard T. Mowday, <i>University of Oregon</i>	1988–90

SOCIAL CONSTRUCTION OF COMMUNICATION TECHNOLOGY

JANET FULK
University of Southern California

According to social constructivist theories of communication technology in organizations, work group members share identifiable patterns of meaning and action concerning communication technology. Empirical evidence of these patterns was found in a study of electronic mail use among a group of scientists and engineers. Social influences on technology-related attitudes and behavior were consistently stronger when individuals were highly attracted to their work groups. For individuals with low attraction, the specific patterns of influence were consistent with predictions from conformity research for compliance effects only; for those with high attraction, both compliance and internalization effects emerged.

The use of sophisticated communication technologies in the conduct of work is a commonplace in organizational life. Organizational researchers have developed theories of the social construction of such technologies. These theories propose that interactions with social agents control the technologies and their effects and that attitudes toward and uses of technologies converge in social systems (Contractor & Eisenberg, 1990; Fulk, Schmitz, & Steinfield, 1990; Poole & DeSanctis, 1990; Rice & Aydin, 1991; Rice, Grant, Schmitz, & Torobin, 1990; Schmitz & Fulk, 1991). However, precious little empirical research has been conducted to enrich knowledge claims within this paradigm. The research reported here contributes to what is hoped will be a continually expanding body of empirical evidence that can increase knowledge not only of communication technology, but also of underlying organizational social processes.

THEORY AND HYPOTHESES

Theories of the Social Construction of Communication Technology

Fueled by a growing body of historical studies of the social shaping of technological systems as diverse as electrical power networks (Hughes, 1983), the bicycle (Pinch, 1986), and missile guidance systems (MacKenzie

I wish to thank Peter Monge for helpful comments on an earlier draft of this article. Thanks also to Joseph Schmitz, Charles Steinfield, and Daehee Ryu for assistance with the larger data collection effort. Two anonymous reviewers for this journal provided valuable assistance in preparing the revision.

& Wajcman, 1985), social constructivist thinking about technologies has penetrated the organizational context. Weick (1990) drew on Law's (1987) study of Portuguese navigation in the 13th through 16th centuries to argue that technology emerges from relations among a heterogeneous set of elements. Weick's conceptualization of the sensemaking of communication technology as "equivocal" captures a core assumption underlying this new trend in communication technology studies: technologies are equivocal because they can be interpreted in multiple and perhaps conflicting ways. Technologies provide unusual problems in sensemaking because their processes are often poorly understood and because they are continuously redesigned and reinterpreted in the process of implementation and accommodation to specific social and organizational contexts. Communication technologies in particular link disparate entities in a seamless web that engages joint sensemaking in the process of mediated interaction.

If communication technologies are indeed equivocal, what is the essential character of this equivocality, how does it arise, and how is it resolved, if at all, in the process of utilization? Trevino, Lengel, and Daft (1987) drew on structural symbolic interactionism (Stryker & Statham, 1985) to argue that technology users create rich meanings in mediated communication through their choices of media with specific symbolic features. In McLuhan's (1964) terms, the medium is the message. For example, the use of a formal, written medium symbolizes authority and can represent a dominance move on the part of the sender.

Yet symbolic features need not be fixed attributes of a medium. The symbolic meanings may well arise, be sustained, and evolve through ongoing processes of joint sensemaking within social systems. In their "adaptive structuration" approach to communication technology, Poole and DeSanctis (1990), drawing on Giddens (1979), highlighted the joint production and reproduction of structure and action in the process of interacting via communication technology. From their perspective, a constantly evolving set of social structures and technological manifestations arises as groups selectively appropriate features of both a technology and the broader social structure in which the group is embedded. As Contractor and Eisenberg noted, communication structure and uses of organizational media shape each other "in an emergent pattern of mediated and non-mediated social interaction" (1990: 147).

Structuration processes also affect meaning construction. Weick noted that communication technologies "are both a cause and consequence of structure. This dual role of technology occurs because structuring is an ongoing process that shapes the meaning of artifacts through scripts, interaction, and tradition and is itself shaped by those meanings" (1990: 22-23). Barley (1986, 1990) similarly posited that the reciprocal link between structure and action is tied to scripts that carry the rules and resources of the interaction structure. Scripts represent cognitive organization that reflects and reproduces social action. Poole and DeSanctis more forcefully stated the inescapability of coordinated meaning construction in the social shaping of

a communication technology: "Objectification and decontextualization conceal the social nature of technologies. Continually bombarded by such discourse, we forget that users constitute and give meaning to technologies. Until applied by a user in a specific context, a GDSS¹ or any other technology is simply dead matter" (1990: 178).

Within the realm of the mutual determinism of technology and social structure, what specific social processes engage individuals? In their social influence model of technology use, Fulk and colleagues (1990) identified multiple social psychological processes that can explain coordinated patterns of meanings and behaviors toward technology within social groupings. Foremost among these processes are those described by social learning theory (Bandura, 1986) and social information processing theory (Salancik & Pfeffer, 1978).

Social learning theory (Bandura, 1986) predicts coordinated behaviors and meanings that arise through several processes of modeling. (1) Observational learning occurs when individuals acquire cognitive skills, new behavior patterns, or both by observing the behavior of other individuals. (2) Inhibitory and disinhibitory effects arise from observation of the consequences of a behavior for others who have exhibited that behavior and from observers' estimates of the likelihood of experiencing the same consequences. (3) Response facilitation is present when models' behavior serves as a social prompt for behaviors for which previously there has been insufficient inducement. (4) Arousal occurs because emotional reactions in individuals tend to elicit emotional reactions in observers. (5) Environmental enhancement occurs when "a model's behavior channels the observers' attention to particular stimuli or draws observers into settings which elicit similar behavior" (Bandura, 1986: 49).

Behavioral patterning through modeling is not simply imitation; it involves considerable cognitive processing of stimuli. The symbolic representation of experiences is a key step in the retention of modeled behavior. The complex interplay of behavior and cognition can produce not only coordinated behavior, but also coordinated meaning structures. Furthermore, judgments and attitudes can be the subject of modeling and thus can be acquired through social learning. Social influences operating within closely knit networks are key sources of social learning (Bandura, 1986: 152). The application of these principles to communication technology suggests that technology-related behaviors and attitudes can be produced in a work setting through processes of modeling, which increases the likelihood that attitudes and behavior will converge between modelers and observers (Fulk et al., 1990).

Social information processing theory (Salancik & Pfeffer, 1978) proposes multiple mechanisms whereby co-workers influence the attitudes and behavior of individuals. Social information from co-workers can take several

¹ GDSS represents group decision support system technology.

forms: (1) overt statements that individuals assimilate, (2) interpretations of events, (3) communications that increase the saliency of events simply by calling attention to them, and (4) provision of standards for judging the appropriateness of particular behaviors and for appropriately rationalizing workplace activities. Fulk, Steinfield, Schmitz, and Power (1987) proposed that social information will influence perceived media characteristics, perceived communication task requirements, attitudes toward communication media, and media use behavior. The net effect is to produce "a similar pattern of media attitudes and use behavior within groups, even across tasks with different communication requirements," and "different patterns of media usage across groups" (Fulk et al., 1987: 542–543).

These constructivist perspectives share the core proposition that social and symbolic processes produce patterns of shared cognitions and behavior that arise from forces well beyond the demands of the straightforward task of information processing in organizations. The mechanisms by which these coordinated patterns theoretically are produced differ among the perspectives not so much because of conflicting premises as because the theories focus on different aspects of the social construction process. Structuration premises, for example, focus on the group level of analysis (Poole, Siebold, & McPhee, 1985), whereas the structural symbolic interactionist perspective (Trevino et al., 1987) focuses on the symbolic meanings of media, and the social influence perspective (Fulk et al., 1990) seeks to explain social effects on individual attitudes and behavior. They all share the theoretical assumption that cognitions and behavior can be predicted from knowledge of social and symbolic interaction.

The purpose of the research reported here was to empirically demonstrate such convergent patterns of meaning and action and to show that such patterns are more consistent with social influences than with other mechanisms that might have produced them. A key contributor to this demonstration is individuals' attraction to the groups in which the social influences are presumed to occur.

Convergent Meanings and Coordinated Behavior in Formal Work Groups

Decades of research in social psychology have demonstrated that formal work groups are the sites of important social influences and reality construction processes. Research on conformity distinguishes between internalization and compliance effects of groups on individuals. Internalization refers to individuals' private acceptance of group messages and the incorporation of group meanings and attitudes into their own constructions of reality. Internalization produces convergence of interpretations, attitudes, and meanings between an individual and a group. Compliance refers to individual behavior that conforms to perceived group pressures. Compliance produces convergence of behavior patterns between an individual and a group. Festinger (1953) identified these two key types of social influence as private acceptance and compliance. Some researchers have interpreted Deutch and Gerard's (1955) categories of normative and informational influence as re-

flecting acceptance and compliance (e.g., Allen, 1965; Nail, 1986). Considerable evidence has accumulated over the decades to support the existence of social influence through internalization and compliance (for reviews, see Levine and Russo [1987], Moscovici [1980], McGrath and Kravitz [1982], Bettenhausen [1991], and Levine and Moreland [1990]).

One key moderator of internalization and compliance effects is an individual's attraction to a group. In general, research has shown that high attraction to a group is conducive to internalization, as individuals enact shared norms and submit to perceived mechanisms of social control (Braver, 1975; Festinger, Gerard, Hymovich, Kelley, & Raven, 1952; Gerard, 1954; O'Keefe, Kernaghan, & Rubenstein, 1975; Rasmussen & Zander, 1954; Seashore, 1954; Wyer, 1966). Internalization under conditions of attraction results from drives to reach psychological agreement, reduced tension and anxiety, enhanced communication between an individual and the group, and perceived group pressures against dissent (Shaw, 1981).

When an individual does not experience attraction to a group, internalization is unlikely. The individual does not experience the same drive for agreement, does not perceive pressures toward attitude and value conformity, and is not motivated to seek such consensus. Also, there is less communication between the individual and the group than when high attraction exists (Back, 1951; Festinger, Schachter, & Back, 1950; McCauley, 1989; Tuckman, 1965). The absence of internalization implies the absence of convergence between the individual and the group in attitudes, meanings, and interpretation. Translating these conclusions to the concept of social construction of communication technology, I propose

Hypothesis 1: Work group technology attitudes will be a positive predictor of technology attitudes for individuals who exhibit high attraction to the group, but not for individuals who exhibit low attraction.

The net effects of compliance pressures are different from those of internalization. An individual may engage in compliance behavior toward a group in the absence of attraction. If attraction is low, a person may comply with behavioral expectations out of fear of recrimination (Janis, 1982; McCauley, 1989). This behavioral compliance does not require attitudinal compliance (internalization). The person merely complies by aligning visible behavior with group expectations. An extreme historical example of mere compliance is the finding that more than 90 percent of the members of the U.S. Army taken prisoner of war during the Korean conflict collaborated with their captors, but that their collaboration was simply "overt compliance unrelated to changes in beliefs" (McGuire, 1985: 251). Given the existence of compliance pressures, it is not surprising that research often finds low correlations between attitudes and behaviors (McGuire, 1985).

If attraction to a group is high, however, a person may comply in response to group norms (Gladstein & Reilly, 1985; Moorhead, 1982), a powerful and attractive leader (McCauley, 1989; Nemeth & Staw, 1989), or "a

more tacit form of influence, that of agreement with majority viewpoints" (Aldag & Fuller, 1993: 542). Thus, pressures are likely to be more potent when individuals experience attraction to a group. Perhaps the strongest theoretical argument for this position is presented in Janis's (1982) model of "groupthink," in which experienced cohesion is a critical antecedent condition. That theory proposes that when group cohesion is high—when all or most members experience attraction to the group—individuals will experience greater pressures toward unanimity and greater self-censorship, which will produce more uniform behavior. Although some empirical research supports this theory, overall this premise as articulated in relation to groupthink has yet to be subjected to adequate empirical testing (Aldag & Fuller, 1993). Applying this research and theory to the communication technology-related behaviors of members of organizational work groups, I propose

Hypothesis 2: Work group members' technology use behavior will be a positive predictor of an individual's technology use behavior.

Hypothesis 3: Work group members' technology use behavior will be a stronger predictor of technology use behavior for individuals who exhibit high rather than low attraction to the group.

In combination, the literature and hypotheses suggest that when an individual experiences attraction to a group, the individual "buys in" to group norms and majority attitudes and exhibits behavior that mirrors that of the group. Conversely, when an individual experiences little attraction to the group, only outward behavioral conformity resulting from compliance pressure can be expected. The lack of internalization means that attitudinal conformity is unlikely.

Work-group- versus social-network-based social influence. Work groups are not the only sources of the social construction of technology-related attitudes and behaviors. Four studies have demonstrated convergence of technology-related meanings and behavior in communication networks. Rice, Grant, Schmitz, and Torobin (1990) and Rice and Aydin (1991) constructed relational communication networks based on interaction patterns in an organization. Rice and colleagues (1990) found that individuals were more likely to adopt electronic mail if others in the network also adopted it. Rice and Aydin (1991) found that individuals perceived their network partners as holding similar attitudes toward a computerized information system. Schmitz and Fulk (1991) and Fulk and Ryu (1990) built "ego networks" composed of "those interconnected individuals who are linked by patterned communication flows to a focal individual" (Rogers & Kincaid, 1981: 134). Each ego network included a focal individual's supervisor and the five people who communicated most frequently with the focal individual using all media. Schmitz and Fulk (1991) found that the attitudes and

technology-related behaviors of individuals converged with the average of the actual attitudes and behaviors of the individuals in their ego networks. In a different sample, Fulk and Ryu (1990) found that individuals' attitudes and technology-related behaviors converged with their perceptions of the attitudes and behaviors within their ego networks.

What are the relative strengths of formal work group social influence and social network ties? To address this question, I included in the predictive model the previously demonstrated link between ego-network-based social influence variables and an individual's technology-related attitudes and behaviors. People with whom individuals communicate frequently using all media (their ego networks) are likely to influence their attitudes and behaviors toward use of communication media through processes of behavioral modeling (Bandura, 1986). However, the conformity pressures on individuals attracted to formal work groups are somewhat different. They appear to be importantly linked to unique group-level features, including leadership and power, norms, and identifiable majority positions (Nemeth & Staw, 1989). The net effect is to produce a different type of pressure directed toward compliance, but also directed toward internalization when the individuals are attracted to the groups. Thus, I predicted that work group social influence would show explanatory power separate from that of the influences emanating from ego networks.

Hypothesis 4: Work group members' attitudes and use of technology will explain variance in individuals' communication technology use and attitudes beyond that explained by ego-network-based social influence variables.

A related question is, how strong are work group social forces in comparison to influences emanating from an individual's ego network? Most research to date has found that network variables have only moderate effects on technology-related attitudes and behaviors (Rice & Aydin, 1991; Rice et al., 1990; Schmitz & Fulk, 1991). By contrast, the vast literature on conformity has demonstrated group effects on highly attracted individuals that are far from moderate across a wide variety of influence objects. To investigate the relative strength of these forces on technology-related behavioral patterning and coordinated meaning, I tested a final hypothesis:

Hypothesis 5: For individuals who exhibit high attraction to a work group, work-group-based social influence variables will be stronger predictors of individual attitudes and behaviors than ego-network-based social influence variables.

Richness, usefulness, and frequency of use. Two attitudes and one behavior were of particular interest in the research reported here. The first attitude is the perceived richness of a technology, or an individual's percep-

tion of the technology's ability to facilitate shared meaning (Trevino et al., 1987). Richness perceptions are based on the capability of a technology to: (1) provide instant feedback, (2) transmit verbal and nonverbal cues, (3) use natural language rather than numbers, and (4) convey personal feelings and emotions. Richness has been a central variable in the study of communication media use in organizations. The second attitude is the perceived usefulness of the technology as a communication medium. Schmitz and Fulk (1991) described perceived usefulness as a key evaluative belief about a technology. The behavior is the reported frequency of use of the technology. Thus, I expected internalization effects for the two attitudes, perceived richness and perceived usefulness, and compliance effects for the behavior, perceived frequency of use.

Media expertise. The communication technology studied in this research was electronic mail. Schmitz and Fulk (1991) included three media expertise variables in their model of social influence on media perceptions for electronic mail: medium experience, computer experience, and keyboard skills. They argued: "Individuals with little experience or skills will have difficulty making judgments of its richness and may be inhibited from using the medium even in a supportive social environment. Experience and skill should facilitate electronic mail assessments and use by virtue of increasing individual mastery of medium techniques. Empirical research (Kerr & Hiltz, 1982; Johansen, 1988; Schmitz, 1988) provides confirmation of positive relationships between electronic mail use and medium expertise that may reflect increased electronic mail familiarity" (1991: 492). To attain consistency with this earlier research, I included these predictors of the perceived richness of a technology in the model employed here.

Schmitz and Fulk also proposed a link between the actual use behavior of significant sources of social influence and an individual's perception of the usefulness of technology. They argued: "Coworkers who model electronic mail use facilitate the acquisition of positive evaluative beliefs (attitudes) by their peers. Clearly, individuals may form negative assessments of behavior modeled by coworkers, but social processes elaborated by Bandura (1986), Rose (1962), and Salancik and Pfeffer (1978) suggest that positive assessments are more likely" (1991: 494). Again, to attain consistency with this earlier work, I included this additional link to the perceived usefulness of the technology in the model tested here. There was little evidence to suggest that internalization and compliance would influence this link differently, however. Thus, I proposed no moderating hypothesis.

Perceived task attributes and demographics. Social constructivists have argued that the role of social interaction has been underestimated in technology effects models of communication technology use. The research reported here was designed to provide empirical evidence of effects consistent with social constructivist premises, in support of existing theoretical statements. Social constructivist models are not deterministic, however. That is, theorists do not presume that social interaction is the only explanation for technology-related attitudes and behaviors. Multiple models point

to the influences of task features and individual differences on technology-related behavior. I viewed those variables as controls in this research in order to estimate incremental social influence effects. In essence, the social influence effects predicted here have gone unmeasured under other models of technology use. Incremental variance explained would represent opportunities for increasing the comprehensiveness of models of communication technology effects. I included seven task and individual demographic predictors as control variables. Task routineness may affect technology use, in that media of lower "bandwidth" (Short, Williams, & Christie, 1976), or richness (Daft & Lengel, 1984), may be appropriate for routine tasks. Such media convey fewer nonverbal cues and provide leaner, less varied feedback (Daft & Lengel, 1984). Thus, they are less appropriate for complex and ambiguous tasks than are richer media (Daft & Lengel, 1984; Short et al., 1976). When an individual's job is highly nonroutine, use of less rich media, such as written memos and electronic mail, will be relatively infrequent (Daft & MacIntosh, 1981). Job pressures will lead an individual to favor media that provide rapid communication capabilities, such as telephone and electronic mail. Both Trevino and colleagues (1987) and Steinfield and Fulk (1986) found support for this prediction. Task interdependence within a group should lead individuals to increase communication in general, across all media, over the amount of communication associated with relative autonomy in carrying out a task. Similarly, task interdependence across groups should lead to a higher volume of information processing and communication than intergroup independence (Daft & Lengel, 1986). If social influence processes are indeed powerful, they should be able to demonstrate unique effects beyond those attributable to perceived task attributes. In sum, technology use for electronic mail should be positively related to task routineness, job pressures, task interdependence with a group, and task interdependence across groups.

Three individual-level demographic characteristics were included as control variables: age, education, and gender. Age and educational level were included because younger and more educated individuals are believed to be more receptive to technology (Dutton, Rogers, & Jun, 1987). Gender was included because women's acceptance of technology is a key issue in the computing literature (e.g., Gattiker, *in press*). These demographic controls must be considered limited, however, since the data in this study were highly skewed toward highly educated men.

Endogenous relationships. Schmitz and Fulk (1991) proposed in addition that perceived richness will predict both the perceived usefulness and frequency of use of a technology. They argued:

The SI [social influence] model proposes that efficiency is not the only criterion for assessing media—a richer medium can be seen as equally useful for unambiguous tasks as for ambiguous ones. Media richness does not constrain a medium's usefulness only to complex and difficult communication tasks. The more types of situations for which a medium is usable (the richer it is

perceived to be in terms of speed, number of channels, type of language, and personalness), the more useful it may be seen and the more it may be used, regardless of efficiency considerations. As Markus' (1988) research showed, individuals do not always make the most efficient and effective media choice using criteria of objective efficiency (1991: 492).

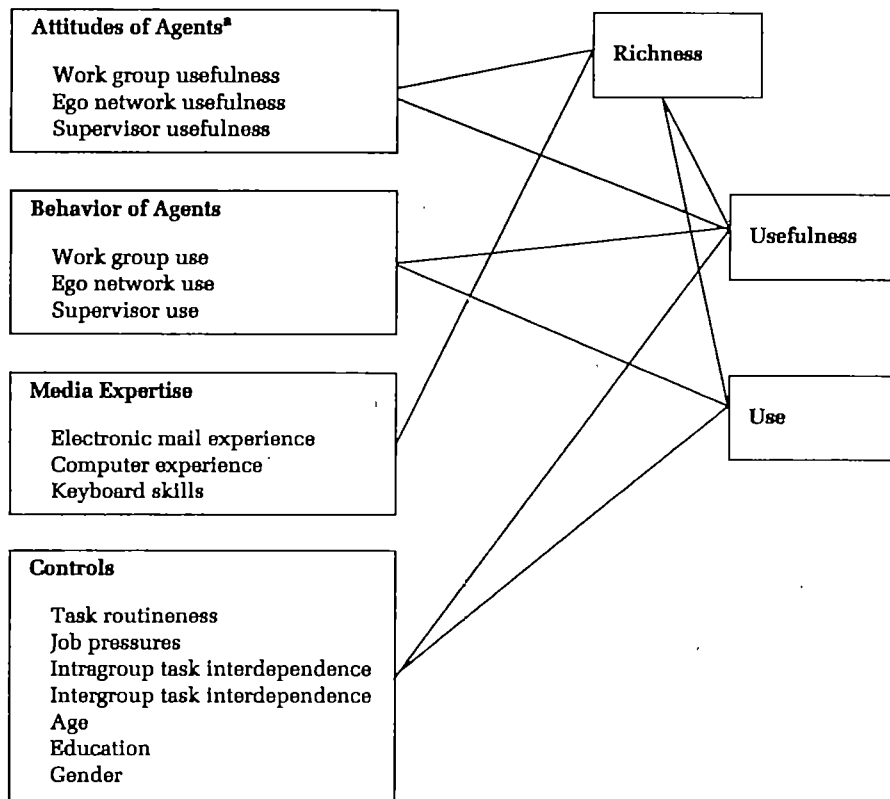
Thus, this proposed relationship is also empirically modeled. Figure 1 and Table 1 provide summaries of the overall model that was tested separately for individuals with high versus low attraction to a work group. Table 1 indicates the specific hypotheses.

METHODS

Data and Procedures

The research was conducted in the production research company of a major petrochemical corporation studied by Schmitz and Fulk (1991). The

FIGURE 1
Schematic of Relationships



* For the low-attraction-to-group respondents, no links from attitudes were hypothesized

TABLE 1
Hypothesized Model^a

Variables	Endogenous Variables		
	Individual Attitudes		Individual Behavior
	1. Richness	2. Usefulness	3. Use
Exogenous			
Attitudes of influence agents			
1. Work group usefulness	$\gamma_{1,1}$	$\gamma_{2,1}$	
2. Ego network usefulness	$\gamma_{1,2}$	$\gamma_{2,2}$	
3. Supervisor usefulness	$\gamma_{1,3}$	$\gamma_{2,3}$	
Behavior of influence agents			
4. Work group use		$\gamma_{2,4}$	$\gamma_{3,4}$
5. Ego network use		$\gamma_{2,5}$	$\gamma_{3,5}$
6. Supervisor use		$\gamma_{2,6}$	$\gamma_{3,6}$
Media expertise			
7. Electronic mail experience	$\gamma_{1,7}$		
8. Computer experience	$\gamma_{1,8}$		
9. Keyboard skills	$\gamma_{1,9}$		
Controls			
10. Task routineness		$\gamma_{2,10}$	$\gamma_{3,10}$
11. Job pressures		$\gamma_{2,11}$	$\gamma_{3,11}$
12. Intragroup task interdependence		$\gamma_{2,12}$	$\gamma_{3,12}$
13. Intergroup task interdependence		$\gamma_{2,13}$	$\gamma_{3,13}$
14. Age		$\gamma_{2,14}$	$\gamma_{3,14}$
15. Education		$\gamma_{2,15}$	$\gamma_{3,15}$
16. Gender		$\gamma_{2,16}$	$\gamma_{3,16}$
Endogenous			
1. Richness		$\beta_{2,1}$	$\beta_{3,1}$
Hypothesis 1: $\gamma_{1,1}(H) > 0$; $\gamma_{1,1}(L) = 0$			
$\gamma_{2,1}(H) > 0$; $\gamma_{2,1}(L) = 0$			
Hypothesis 2: $\gamma_{3,4}(H) > 0$; $\gamma_{3,4}(L) > 0$			
Hypothesis 3: $\gamma_{3,4}(H) > \gamma_{3,4}(L)$			
Hypothesis 4: Coefficient of determination for full model > coefficient of determination for reduced model excluding $\gamma_{1,1}$, $\gamma_{2,1}$, $\gamma_{2,4}$, $\gamma_{3,4}$ in both high and low conditions.			
Hypothesis 5: For the high-attraction condition:			
$\gamma_{1,1} > \gamma_{1,2}$ and $\gamma_{2,1} > \gamma_{2,2}$ and $\gamma_{3,4} > \gamma_{3,5}$			

^a H = high-attraction condition; L = low-attraction condition.

company provided electronic mail access for all employees, excluding maintenance and workshop personnel below the rank of supervisor. Virtually all company sites worldwide could be reached through the electronic mail system, as could some vendors.

Surveys were distributed to all electronic mail account holders. The survey was described as a university-sponsored research project and confidentiality was guaranteed. Respondents mailed the surveys directly to the university. Prior to receiving the survey, each employee received an electronic mail message from the company's chief executive that assured em-

ployees that the project was university-sponsored and that the company would have access to summary statistics but not to any individual responses. Of the 636 persons with electronic mail access, 622 actually used the system. Ninety-two percent of the latter returned the surveys. A total of 551 surveys, representing 89 percent of the electronic mail users, provided complete communication network data.

The company was functionally organized into six major divisions, each with a number of work groups. Work group membership did not cut across divisional lines, and there were no cross-functional project teams. The largest group included 17 individuals. Included in this research were all members of groups of 4 persons or more. Groups of 1 to 3 persons primarily represented laboratory technicians working individually with scientists, rather than formal work groups. Of the 76 groups of 4 or more persons, usable data were available for 68. The net number of respondents was 408 individuals. They were primarily men (80%) who held at least B.A. degrees (80%) and were between 30 and 50 years of age (72%).

The survey was supplemented by observations of system use and by postsurvey interviews with 27 individuals chosen to maximize variation in hierarchical level, job type, and attitudes toward electronic mail. Individuals' work group membership was obtained from company records. Actual electronic mail message traffic was computer-captured for a period of one week of system use for comparison to the survey reports.

Measures

Endogenous variables. Perceptions of electronic mail richness were measured by asking respondents to rate electronic mail on a five-point scale (1 = not at all rich, 5 = extremely rich). To assist with this judgment, respondents were provided with Daft and Lengel's (1984) definition of media richness, in which four criteria are applied: (1) ability to give and receive timely feedback, (2) ability to transmit a variety of nonverbal cues, (3) ability to tailor messages to personal circumstances, and (4) communication using rich and varied language. Average daily electronic mail use was measured by summing five items reporting the exact number of electronic mail notes and messages each respondent sent, received, and forwarded. This measure correlated .45 with a measure of message traffic over a period of one week taken from computer-captured data two months after survey administration. This magnitude is consistent with that found by Schmitz (1988) for a sample of government employees. Respondents assessed electronic mail usefulness on a five-point scale (1 = not at all useful, 5 = extremely useful).

Exogenous variables. All measures of social influence were obtained from the survey data provided directly by the sources of social influence on a focal individual. The ego network was identified by asking each individual to identify the supervisor and five individuals with whom they had frequent communication using all media. The actual survey responses for each of these ego network partners were then appended to the data record for each focal individual. Thus, the supervisor usefulness measure was the actual

response a focal individual's supervisor provided on the five-point scale measuring electronic mail usefulness, and supervisor use was the sum across the five items measuring electronic mail use reported by the supervisor. Network use and network usefulness were calculated as numerical averages of network members' reports. If data were missing from more than 25 percent of an individual's ego network members, the ego network values were treated as missing.²

Individuals who shared a supervisor were considered members of a given formal work group. Supervisors were identified from company records, and the actual survey responses of the work group members were appended to each focal individual's data record. Work group usefulness and work group use were calculated as averages from the actual responses of the group members (excluding the focal individual), in the same fashion as for the ego network.

Medium expertise. Respondents reported their number of years experience using electronic mail. Computer experience and keyboard skills were rated on five-point scales (1 = none, 5 = an enormous amount, and 1 = very poor, 5 = very good, respectively).

Attraction to a group. Measurement techniques for this variable have varied substantially across studies. One method has been to measure the levels of attraction of individual group members to a group as a whole, average them, and then apply this average score to the group as a whole for studies at a group level of analysis, and to individual members for studies at the individual level. As Evans and Jarvis (1980: 366) noted, this procedure fails to take into account variability in attraction among group members. Given these concerns as well as the individual-level focus of the hypotheses for this research, attraction was defined as each individual's attraction to his or her work group (Evans & Jarvis, 1980).

Attraction was measured by Stogdill's (1965) five-item scale, which asks for perceptions of the degree to which members of an individual's work group: (1) cooperate with each other, (2) regard each other as friends, (3)

² The reliability of the work group and network exogenous variables is an important issue, particularly given that the usefulness measure is a single-item scale. A typical strategy would be to calculate interrater reliability within groups and networks, a calculation reported later for the attraction-to-group measure. However, this strategy is less helpful for the usefulness measure than for the attraction moderator. Indeed, interrater reliability for the exogenous variables is conceptually similar to the hypotheses themselves, except that it is at the group and network rather than individual levels. If social constructivist predictions are on the mark, responses to these measures should be quite similar in groups in which most individuals report high attraction (a high reliability coefficient is observed) and less similar in groups in which attraction is lower. Overall tests would combine the two types of group and arrive at an average reliability figure. As indicated in the discussion section, research on cohesion has shown that attitudes and behaviors are more similar across individuals in cohesive groups. Thus, how should the lower reliability for the groups in which average attraction is low be interpreted? I could label it low reliability but could also describe it as totally consistent with a lack of internalization in such groups.

know that they can depend on each other, (4) stand up for each other, and (5) work together as a team. Schriesheim (1980) reported a convergent validity coefficient of .75 between this measure and Seashore's (1954) measure and a significant result for a within-versus-between-group analysis of variance, demonstrating more similarity of scores within a group than across groups. Several studies have obtained acceptable reliabilities and significant predictive correlations using the scale (Greene, 1976; Stogdill, 1965). In this group of respondents, the coefficient alpha was .86, and analysis of variance results were significant ($F_{67,341} = 2.17, p < .05$).

Task features and demographics. Task routineness was measured by four items describing how often a job involved (1) routine and repetitive tasks, (2) tasks with clearly defined outcomes, (3) standard operating procedures, and (4) well-defined subject matter. The coefficient alpha for this measure in these data was .77. Job pressure was measured by two items describing how often a job involved (1) crises and urgent matters and (2) time pressures. The coefficient alpha was .76. Both measures used a five-point response scale (1 = very rarely, 5 = very often). Intragroup task interdependence was measured by four items based on work by Lynch (1974) describing the degree to which, within a group, work products are (1) independent of others' work, (2) fed into someone else's work, (3) dependent on input from someone else's work, and (4) completed with others in a team approach. Coefficient alpha was .74. Intergroup task interdependence was measured by the same four measures recast to contrast an individual's work group and other groups in the company. The response categories for both intragroup and intergroup interdependence ranged from 1, "not at all," to 5, "very much." Coefficient alpha was .75. Each respondent also reported gender, age at last birthday, and the highest level of education completed.

Analysis

Individuals were assigned to two group "conditions," high attraction to the group and low attraction to the group, on the basis of a median split of the attraction-to-group scores. I tested the model using maximum likelihood estimation in PC LISREL 7.12 and compared the results for the two conditions. The fit of each structural model was assessed by three methods. The first was a chi-square test. A nonsignificant chi-square suggests a good fit of a theoretical to an observed covariance matrix. Because chi-square is sensitive to sample size and represents an overly conservative estimate for large samples, I also report the ratio of chi-square to degrees of freedom. Wheaton, Muthen, Alwin, and Summers (1977) proposed that a ratio of 5 or less represents a good fit. Second, an adjusted goodness-of-fit ratio above .9 and not very different from the unadjusted ratio represents a good fit (Jöreskog & Sörbom, 1989). Third, the root-mean-squared residual gives an estimate of the average magnitude of the fitted residuals, which normally should be less than approximately .05. I assessed the significance of individual paths using

t-ratios. Coefficients of determination are reported for each endogenous variable and for each model as a whole.

Hypothesis 1 was tested by examining the *t*-ratios in each condition for the paths from (1) work group usefulness to richness and (2) work group usefulness to usefulness. The hypothesis predicts significant, positive *t*'s for high-attraction individuals and nonsignificant *t*'s for low-attraction individuals.

Hypothesis 2 was tested by assessing the significance of the *t*-ratio for the path from work group use to use for the two attraction conditions. To test the difference in paths posited in Hypothesis 3, I estimated a multisample LISREL model, using the high and low attraction-to-group conditions as the two samples and specifying as a constraint that the two paths would be equal. The chi-square for this model was compared to the chi-square for a multisample null model with no equality constraints (gamma was free for both conditions). A significant difference in the chi-square values would lead to a rejection of the null hypothesis that the paths are equal, and the magnitudes of the paths suggest the direction of the difference (Jöreskog & Sörbom, 1989: Chapter 9). A significant chi-square difference and a path coefficient of larger magnitude for the high-attraction individuals would support Hypothesis 3.

To test Hypothesis 4, I estimated a LISREL model that excluded the two work group exogenous variables for each condition. The difference in the coefficient of determination between this model and the full model was tested for significance. A significantly higher coefficient of determination for the full model would indicate support for the hypothesis.

Hypothesis 5 was tested for the high-attraction condition by estimating a null model that constrained the coefficient for each work-group-based social influence variable to be equal to the corresponding coefficient for ego-network-based social influence. I compared the chi-square for this constrained model to that for the unconstrained model. A significant drop in the chi-square value for the constrained model would indicate a difference in the two models; the direction of the difference would be reflected in the magnitude of the coefficients (Jöreskog & Sörbom, 1989).

Finally, to assess the unique contribution of the social influence variables, I calculated a reduced model for all respondents by excluding the media expertise, task, and demographic variables from the exogenous variable set. The decrement in the coefficient of determination would indicate the amount of variance explained uniquely by these other variables.

RESULTS

Tables 2 and 3 present descriptive statistics, and Table 4 presents LISREL results. For the high-attraction-to-group respondents, the chi-square with 20 degrees of freedom was statistically significant at 42.07, but the chi-square-to-degrees-of-freedom ratio was acceptable at 2.10. The adjusted goodness-of-fit ratio was not good at .80, possibly as a result of the addition

TABLE 2
Means, Standard Deviations, and Correlations, Low-Attraction-to-Group Respondents^a

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Use	15.49	15.35																			
2. Richness	3.43	0.94	.27																		
3. Usefulness	4.18	0.83	.31	.52																	
4. Keyboard skills	3.61	0.94	.28	.22	.31																
5. Computer experience	2.98	1.27	-.07	-.06	-.01	.27															
6. Electronic mail experience	5.80	2.67	.16	-.07	.04	.17	.07														
7. Work group use	16.23	9.58	.35	.15	.27	.10	-.11	.17													
8. Work group usefulness	4.30	0.40	.22	.13	.18	.12	-.06	.09	.50												
9. Supervisor use	27.58	14.21	.15	.11	.03	.03	-.15	-.01	.15	.08											
10. Supervisor usefulness	4.61	0.56	.12	.15	.13	-.01	-.12	-.01	.08	.06	.06										
11. Ego network use	20.38	10.31	.31	.11	.22	.23	-.06	.12	.27	.18	.14	.18									
12. Ego network usefulness	4.41	0.42	.18	.12	.20	.11	.04	-.04	.20	.37	-.05	-.03	.37								
13. Gender	1.21	0.41	.05	.06	.14	.10	-.07	-.04	-.01	.03	-.01	.04	.02	-.05							
14. Age	40.33	9.38	.08	-.11	.05	.14	-.01	.10	-.01	-.11	.04	.01	.04	.06	-.13						
15. Education	4.44	1.31	-.01	-.08	-.09	-.04	-.02	-.01	.04	-.04	.02	.02	.01	.08	-.37	.17					
16. Task routineness	2.83	0.84	.08	.17	.09	.10	-.19	-.07	.03	.05	.12	.10	.12	.08	-.03	.01	-.08				
17. Job pressures	6.58	2.02	.25	.14	.20	.15	-.08	.06	.09	.13	-.01	.09	.03	.06	.08	.11	-.03	.14			
18. Intragroup interdependence	2.84	0.84	.11	.14	.05	.11	-.01	.08	.13	.03	-.04	.07	.04	.04	.01	-.05	-.01	.13	.14		
19. Intergroup interdependence	2.60	0.94	.04	.09	.02	.06	-.03	.04	.18	.13	-.06	.02	.08	.12	-.06	.09	-.02	.09	.21	.30	

^a N = 279. Correlations greater than .13 are significant at $p < .05$.

TABLE 3
Means, Standard Deviations, and Correlations, High-Attraction-to-Group Respondents^a

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Use	16.53	13.45																			
2. Richness	3.65	0.87	.21																		
3. Usefulness	4.40	0.69	.31	.39																	
4. Keyboard skills	3.64	0.94	.17	.31	.29																
5. Computer experience	3.00	1.35	-.07	-.09	.04	.18															
6. Electronic mail experience	5.97	2.09	.10	-.03	.07	.23	-.02														
7. Work group use	15.53	9.76	.50	.23	.24	.14	-.02	.14													
8. Work group usefulness	4.25	0.44	.32	.21	.27	.20	.07	.02	.48												
9. Supervisor use	25.00	12.60	-.01	-.09	-.06	-.07	-.02	-.01	.01	-.10											
10. Supervisor usefulness	4.60	0.53	.03	.06	.17	-.04	-.03	-.03	.11	.06	.01										
11. Ego network use	19.51	10.32	.29	.25	.28	.11	-.10	.15	.30	.31	-.19	.15									
12. Ego network usefulness	4.35	0.37	.20	.17	.21	.23	.08	-.01	.22	.46	-.12	.04	.43								
13. Gender	1.20	0.38	.02	.06	.03	.03	.02	-.15	.03	-.11	.03	.01	-.01	.08							
14. Age	41.76	9.34	-.04	.09	.09	.13	.10	.02	.08	.15	-.07	.23	.04	.05	-.12						
15. Education	4.47	1.29	.11	-.05	-.03	-.02	-.11	.11	.09	.04	.07	.01	.09	-.12	-.37	.01					
16. Task routineness	2.87	0.95	.08	.25	.05	.06	-.33	-.01	.06	.13	.02	-.13	.14	.05	-.04	-.03	.04				
17. Job pressures	6.44	2.01	.26	.11	.07	.14	.03	.11	.19	.10	-.05	.10	.11	.22	-.16	.03	.13	.08			
18. Intragroup interdependence	3.06	0.87	.12	.10	.03	-.07	-.12	-.11	.02	-.04	-.12	-.06	.04	-.04	-.02	-.05	.01	.11	.04		
19. Intergroup interdependence	2.61	0.85	.14	.12	-.01	-.05	.07	-.09	.07	.15	-.13	.03	.12	.11	-.14	-.02	.04	.07	.26	.41	

^a N = 240. Correlations greater than .13 are significant at $p < .05$.

TABLE 4
Results of LISREL Analyses

Variables	Individual Attitudes				Individual Behavior: Use	
	Richness		Usefulness			
	High-Attraction	Low-Attraction	High-Attraction	Low-Attraction	High-Attraction	Low-Attraction
Attitude of agents						
Work group usefulness	.14*	.07	.15*	-.02		
Ego network usefulness	.04	.07	.03	.08		
Supervisor usefulness	.06	.14*	.11	.03		
Behavior of agents						
Work group use			.05	.19*	.41*	.25*
Ego network use			.13	.10	.13*	.21*
Supervisor use			.01	-.07	.03	.05
Media expertise						
Electronic mail experience	-.11	-.11				
Computer experience	-.16*	-.10				
Keyboard skills	.33*	.25*				
Controls						
Task routineness			-.06	-.01	-.01	-.02
Job pressures			.02	.11*	.16*	.20*
Intragroup task interdependence			.06	-.04	.09	.05
Intergroup task interdependence			-.12	-.10	.02	-.10
Age			.01	.11*	-.08	.07
Education			-.03	-.05	.06	-.01
Gender			-.01	.10	.05	.03
Richness			.33*	.48*	.07	.19*

* $p < .05$, one-tailed test

of a large number of nonsignificant control variables. After removal of the nonsignificant controls, the adjusted goodness-of-fit index rose to a minimally acceptable .87. The root-mean-squared residual was acceptable at .031. Overall, these statistics indicate a minimally adequate but not exceptional fit of the model to the data. The total coefficient of determination for the model was .47. Coefficients for each exogenous equation were .16 for richness, .24 for usefulness, and .32 for use.

For the low-attraction individuals, the chi-square was a significant 28.49, but the chi-square-to-degrees-of-freedom ratio was acceptable at 1.42. The adjusted goodness-of-fit ratio was marginal at .86 and rose to .88 with removal of the nonsignificant controls. The root-mean-squared residual was acceptable at .026. Overall, the model appears to provide an adequate but not strong fit to the data. The total coefficient of determination was .39. Coefficients were .11 for richness, .38 for usefulness, and .26 for use.

Hypothesis 1 proposes that work group attitudes will be predictors of individual attitudes for people with high attraction to their work groups but not for low-attraction individuals. For the LISREL analysis for high-attraction condition, both proposed links are significant. Work group usefulness predicts richness (.14) and usefulness (.15). In the low-attraction

analysis, neither path is significant (.07 and $-.02$, respectively). Thus, findings support Hypothesis 1.^{3,4}

Hypothesis 2 proposes that work group members' technology use behavior will predict individuals' technology use in both low- and high-attraction conditions because of compliance effects. Significant LISREL coefficients from work group use to use in both the high- (.41) and low-attraction (.25) conditions support the hypothesis.

Hypothesis 3 proposes that the link between work group use and individual use will be stronger for respondents with high attraction to their groups. For the multisample analysis, the chi-square difference between the model that constrained these paths to be equal and the baseline, unconstrained model was a significant 4.05 ($p < .05$), suggesting rejection of a null hypothesis predicting equal coefficients in the two conditions. As Jöreskog and Sörbom (1989) indicated, the magnitude of the structural coefficients indicates the direction of the difference. Since the path of greater magnitude was the high-attraction-to-group condition (.41, versus .25 for low attraction) Hypothesis 3 was supported.⁵

Hypothesis 4 proposes that work group social influence variables will explain variance beyond that explained by ego network variables. The coefficient of determination for the model with only ego network sources of social influence was .33 for the high-attraction group condition, compared to .47 for the model including work group sources. This difference is significant ($F_{2,190} = 25.09$, $p < .05$). For the low-attraction condition, the ego network model produced a coefficient of determination of .32, compared to .36 for the full model. This difference, although smaller than that for the comparison for the high-attraction condition, is nevertheless significant ($F_{2,190} = 5.94$, $p < .05$). In each case, work-group-based social influence variables explained additional variance, supporting Hypothesis 4.

Hypothesis 5 proposes that work group social influence will be a stron-

³ To establish this effect using a simpler model, I computed partial correlations between work group usefulness and usefulness for each condition, partialing use. A significant partial coefficient for the high-attraction individuals but not the low-attraction ones would be consistent with the hypothesis. The partial correlation coefficient for the high condition was .19 ($p < .05$), and for the low condition, it was .05 (n.s.).

⁴ Schmitz and Fulk (1991) also proposed paths from electronic mail use by social influence sources to individual attitudes. Although I proposed no moderating effect for this link, it is interesting to examine it in the subgroup analyses. Work group use predicted usefulness for the low-attraction condition, but not the high-attraction condition. One possible explanation might be that the explanatory power of the attitudinal variable, work group usefulness, in the high-attraction condition subsumed the effect of the behavior-to-attitude link. Since internalization was unlikely in the low-attraction condition, the behavior-to-attitude link remained as hypothesized. Supervisor use was not significant for either respondent group, and network use was not significant for the high-attraction individuals.

⁵ To establish that attraction to group is a moderator using a simpler model, I performed a multiple regression analysis in which use was regressed on the exogenous variables, attraction to group, and the cross-product of attraction to group and work group use. A significant coefficient resulted ($\beta = .32$, $p < .05$), indicating a significant moderating effect.

ger positive predictor of individual attitudes and behavior than ego network social influence for individuals who exhibit high attraction to their groups. The chi-square value for the null model, in which the three structural coefficients for the ego network paths are constrained to be equal to the corresponding structural coefficients for the work group paths, produced a chi-square of 51.28, compared to a chi-square value of 42.07 for the unconstrained (theoretical) model. The difference between these two values is 9.21, with 3 degrees of freedom, which is significant ($p < .05$). Thus, the data show that the null hypothesis of equal path strength must be rejected. Examination of the magnitude of the coefficients suggests the direction of the difference. The coefficients for ego network and work group are as follows: .04 versus .14 for network usefulness–richness, .03 versus .15 for network usefulness–usefulness, and .13 versus .41 for network use–use. These coefficients demonstrate stronger effects for work group influence. Thus, findings support Hypothesis 5.⁶

Table 4 also shows some significant paths for the control variables. For respondents with low attraction to their groups, job pressure was a significant, positive predictor of both use and usefulness. Age was a positive predictor of usefulness. None of the other control variables produced significant paths. A comparison of the coefficient of determination for the full model including the control variables (.39) to the coefficient of determination for a model that excluded all the control variables (.30) indicates the amount of variance that age and job pressure explained uniquely. This difference of .09 is statistically significant ($F_{7,194} = 3.56, p < .05$).

For the high-attraction-to-group respondents, one control path was positive and significant, that from job pressure to use. The difference between the coefficient of determination for this model (.47) and a model that excluded all control variables (.42) is statistically significant ($F_{7,194} = 2.61, p < .05$). For high-attraction individuals, job pressure explained an additional .05 of the variance. These results show that both social influence and task variables contribute uniquely and significantly to explained variance in technology-related attitudes and behaviors.

DISCUSSION

This study sought to demonstrate shared meanings and behavioral patterns related to communication technology among members of well-defined organizational social systems. Multiple social constructivist premises predict such convergence, and the empirical data demonstrated such a pattern.

⁶ Interestingly, a similar model estimated for the low-attraction individuals produced a chi-square that was not significantly different from that of the theoretical model. No hypothesis was proposed for this condition; however, it is clear that the equality-constrained model cannot be judged substantially different from the theoretical model. Thus, for the low-attraction-to-group individuals, it appears that work group and ego network sources have relatively similar strengths as social influence sources.

This central finding lends empirical confirmation to recent theoretical arguments in favor of the pivotal contribution of social agents. Furthermore, the texture of findings for the attraction subgroups provides even stronger support for the power of social influences as significant explanatory variables.

The results showed that work-group-based social influence explained unique variance in individual attitudes and behaviors, even after ego-network-based social influence, media expertise, perceived task features, and demographic characteristics were controlled. This unique variance was a notable .14 for the high-attraction respondents and a much smaller .04 for the low-attraction individuals. Furthermore, a social influence model that included both work group and ego network predictors but excluded the control variables explained considerably more variance in individual attitudes and behavior than has been found in social influence studies to date: .30 for the low-attraction respondents and .42 for the high-attraction respondents. Clearly, unexplained variance of .48 (high condition) and .70 (low condition) remains to be pursued. Nevertheless, these results suggest the viability of future research and theorizing on the social shaping of attitudes and behaviors related to communication technology.

The subgroup analyses demonstrated that work group social influences were stronger predictors for individuals with high attraction to their work groups, as predicted by the literature on conformity. Attitudes of the remaining work group members predicted each individual's attitudes in the high-attraction condition but not in the low-attraction condition, consistent with an internalization rationale. Work group behavior was a stronger predictor of each individual's behavior for the high-attraction respondents, consistent with a compliance explanation. It is also notable that for the low-attraction respondents, the behavior-to-behavior coefficients for the formal work group and ego network sources were roughly equal (.25 and .21, a nonsignificant difference), whereas for the high-attraction individuals, the work groups were by far the more potent social influence predictor (.44 versus .14, a difference significant at $p < .05$).

One concern raised by these results is whether these differences in predictiveness are the result of differences in the degree to which the work groups and ego networks overlapped for the two conditions. If individuals with low attraction to their work groups included more work group members in their ego networks than did individuals with high attraction, the mutual partialing in the analysis would understate the effects of both social sources more severely for the low-attraction condition. To examine this alternative explanation, I examined overlap. On average, 1.41 work group members were also members of the ego network for the low-attraction respondents. For the high-attraction respondents, 1.73 members were also members of the ego network. The difference is significant ($t = 2.36$, $p < .05$) but is in a direction that favors greater underestimation of social effects for the high-attraction respondents. Thus, the results should be viewed as a more conservative test for the high-attraction-to-group individuals, where the greatest work group social influences were found.

It is also interesting to note the strength of the endogenous links from richness; the link to usefulness is particularly strong (.33 and .48, for high and low attraction, respectively), and the link to use for the low-attraction group is also significant (.19). Although the fact that the variables are both self-reported attitudes may influence these coefficients, that explanation is unlikely to tell the whole story. The richness of a communication medium appears to be an important contributor to attitudes and behaviors related to the technology, particularly when an individual experiences low attraction to a work group. In this sense, the study confirms the theoretical importance accorded perceptions of media richness as formulated by information richness theory (Daft & Lengel, 1984) and incorporated by the model of the social information processing of technology (Fulk et al., 1987). Clearly, the concept of media richness as a shaper of technology use in organizations bears further exploration. Careful attention to uncovering other antecedents of media richness perceptions may also prove valuable. One particularly promising avenue might be investigation of the factors that lead media perceptions to vary from those that would be anticipated on the basis of objective characteristics of a technology itself.

The richness linkage also contributes to identification of indirect social influence effects. Work group usefulness has an indirect effect of .05 ($.14 \times .33$) on usefulness for the high-attraction individuals. The total effect is thus .20 (.05 indirect + .15 direct). For the low-attraction individuals, the indirect effect is .03 ($.07 \times .48$), for a total effect of .01 [.03 + (-.02)]. For the low-attraction respondents, the primary indirect effect of a social influence factor is .07 for supervisor usefulness ($.14 \times .48 = .07$). Overall, it appears that for the high-attraction condition, work group social influences combine with richness to influence usefulness, but that for the low-attraction condition the primary contributor is richness perceptions. Furthermore, the predictive coefficients for richness are more substantial for the low-attraction individuals than for the high-attraction ones. This rationale would be consistent with social constructivist premises that would predict more independent judgments based on perceptions of media features in the absence of internalization pressures. In the presence of such pressures, richness perceptions themselves will be subject to some social construction.

An interesting feature of the findings is the strong results for job pressure, but not for the other task controls. Although I expected that social influences would operate over and above perceived task characteristics, the relative lack of predictive power for three key task characteristics was certainly unexpected. One possible explanation for these findings in relation to use is that task demands for communication behavior may have been different for the high- and low-attraction respondents. An examination of the bivariate correlations indicated a significant correlation of a perceived task feature with attraction to the work group for intragroup task interdependence only ($r = .21, p < .05$). To examine this possible explanation for use, I reestimated the model with the two attraction groups combined. This model produced a small but statistically significant link from intragroup task

interdependence to use (.08), concurrent with a larger, significant coefficient for work group use (.26). None of the other task features was significant. Thus, although this analysis uncovered one additional possible task influence, this type of influence did not substitute for that of the work groups.

Schmitz and Fulk's (1991) contention that efficiency may not be the only mechanism at work in media selection hints at one possible explanation for the failure of task routineness as a predictor. Individuals with routine tasks would find many media options effective, even though a less rich medium might be most efficient. Thus, individuals may opt to use rich media for lean tasks, as a result, for example, of social norms about how to communicate within a work group.

Substantial differences in perspectives and orientations across interdependent groups might explain the results for intergroup task interdependence. These differences would require reconciliation through communication that could reduce barriers and create shared meaning in equivocal situations (Daft & Lengel, 1986), that is, through media richer than electronic mail. No measures of differences in orientations across groups are available. However, the fact that the organization was departmentalized by function suggests the strong possibility of substantial differences across groups operating in different functional environments.

Future research should account for the link of task perceptions to work group conditions. Task perceptions may well arise from social shaping within a work group. From a structuration theory perspective, groups create interaction structures for completing tasks, and these structures constrain communication patterns. Thus, task-based patterns of this type are in part the product of interaction structures socially constructed by groups. Groups create social definitions of tasks and required interactions that then serve to structure behavior. Advocates of social influence perspectives have also viewed tasks as socially constructed. As Weick (1990) argued, tasks themselves are also equivocal, subject to interpretation and reinterpretation in their implementation context. Drawing on Salancik and Pfeffer's (1978) social information-processing approach to job attitudes and task design, Fulk and colleagues (1990) argued that communication tasks are also in part socially constructed. The same social influence processes that produce convergence on technology meaning and use also produce convergence on task interpretations. Tasks then become malleable social constructions, rather than fixed constraints that function as external controls on behavior.

Alternative Explanations Based on Survey Methodology

A possible alternative explanation for these findings as a set is that the survey reports represent attributions, or biased reports of individual attitudes and behaviors, or both. Survey data are generally vulnerable to such criticism. There are several reasons why this explanation is less tenable here than in the typical survey situation. First, I took great care to avoid the same-source data problem for the social influence variables. The social influence measures were taken from the data provided by the social influence

sources themselves, rather than by each focal individual. This process should prevent the upward bias that undoubtedly has been introduced in previous research in which individuals have been asked not only to assess their own attitudes and behaviors, but also to estimate the attitudes and behaviors of their network partners (e.g., Fulk & Ryu, 1990; Rice & Aydin, 1991). Indeed, the method used in this study may have been overly conservative and may have underestimated true social influence effects.

Second, demand characteristics of the survey situation may have consistently influenced the reports of attitudes and behavior for all persons. Great care was taken to ensure confidentiality of responses, and postsurvey interviews confirmed that respondents trusted the confidentiality of the survey reports. Also, the self-reported behavior correlated with objective measures of communication technology use at about the level that has typically been found in other studies (.45), despite the fact that only one week's worth of computer-captured data were available and that this week was a period of vacation.

Third, unlike the ego network measures, in which respondents identified individuals to whom their attitudes and behaviors were then correlated, the formal work group assignments used were based on company records. Thus, the correlation is unlikely to be at risk for upward bias from the same-source problem.

Finally, accounts from the interview data buttress the social influence explanation for the survey data. Several respondents noted that there was a tendency for groups to vary in their communication media preferences. For example, one respondent noted that some groups used electronic mail for everything, whereas her own group used hard copy more often. One administrative secretary also noted, "Every group is different. Some groups pick it [electronic mail] up, for example, one group has a travel file where they have, essentially, a group shared ID that has to do with their travel. Other groups won't bother." Schmitz and Fulk (1991) provided detailed interview data demonstrating not only the role of supervisors and network members in shaping individual perceptions of electronic mail, but also the role of several key norms, metaphors, and stories in shaping how perceptions of the medium might converge in this organization as a whole.

Management Implications

Social constructivist models and the findings of this study have several management implications. In general, technological implementations benefit from substantial attention to nontask and nontechnical conditions. First, monitoring interactions in an organization's social system during the early phases of implementing communication technologies makes early detection and correction of difficulties possible.

Second, when a communication technology is phased in, the early users should be individuals who are (1) positively disposed toward the system and (2) important informal leaders in work groups and the organization as a whole (Fulk et al., 1990). Such individuals can be identified through pre-

implementation research. Investigation of work group structure can identify individuals who are highly attracted to their groups and groups that exhibit the most cohesion. A survey of communication needs can be used to identify the people and groups with the greatest needs for the innovation. For example, a need for cross-locational communication supports electronic mail implementation. A survey can also tap existing attitudes toward a technology. Initial implementation should begin with the individuals who are found to exhibit these predisposing factors in preimplementation research.

Third, adaptive structuration theory suggests the following: "When people struggle with a new technology, the solution may not always be to change the system but to explore ways in which to promote effective use of the technology, through training, advice giving, leadership, or the addition of structures that limit the possibility for misuse" (Poole & De Sanctis, 1990: 190).

Fourth, formal or informal peer training effectively uses social influence processes. In the presurvey and postsurvey interviews here, many users described relying on other group members for help in using less familiar features of the electronic mail system. Virtually all members of this organization had received formal training in using the electronic mail system. However, they relied on co-workers for help in using advanced capabilities or features they did not use regularly. A manager can support such informal peer training or can design system training to incorporate formal peer training on the system. A formal peer help function can support such formal training.

Theoretical Concerns

When viewed generally, this research also suggests that multiple distinct theories of social interaction effectively converge on a set of general behavioral and attitudinal predictions. A valuable direction for future theorizing would be to seek a coherent integration. For example, one issue that bears closer scrutiny is level of conceptualization. Structuration theory takes groups as conceptual units (Poole et al., 1985). A key concern is the relationship of a group as a whole to its technological and social context. This perspective provides little detailed theoretical rationale for describing the individual-group relations that underlie process of compliance and internalization. Perhaps differential conformity pressures are the result of different scripts in different groups. Or perhaps the processes that produce convergent attitudes and behaviors also produce differences in the group-level variable of cohesion (overall attractiveness of a group to all its members), so that cohesion is both a contextual feature and an outcome of interaction processes. There is considerable potential for deeper analysis using structural premises to explain the patterns found here. The process of seeking the micro processes consistent with structural explanations is likely to uncover a number of areas of theoretical convergence with other micro theories of social interaction. Social learning theory is clearly focused on the individual level, yet when multiple models contribute to social learning in

a work group context, a group-level process involving the joint production of meaning occurs. Social learning premises might be expanded to account for the interactive effects found during the process of mutual modeling and joint sensemaking. Such findings would help to move social learning theory closer to structurational approaches. For example, Poole and DeSanctis argued that groups do not simply create interaction structures, which are instead "more often appropriated by the group from larger social institutions" (1990: 180). Social learning theory suggests several processes by which this appropriation might take place. Bandura (1986) argued that there are many sources of modeling over and beyond an individual's immediate social network, including sources as distant as television. Appropriation from the larger social structure will require at a minimum some form of observational learning, as well as disinhibitory effects. Response facilitation effects also may serve as social prompts directing members to appropriate certain structural features rather than others.

Social learning theory also parallels the literature on conformity and social information processing. Observational learning facilitates group members' acquisition of new attitudes and behaviors. Through response facilitation, groups induce individuals to display the behavior learned. To the extent that group norms and expectations serve as social prompts, social learning and conformity explanations for patterned behaviors and meanings in formal work groups converge. Bandura's (1986) description of the attention-directing nature of environmental events in the modeling process is somewhat parallel to the premise of social information-processing theory that co-workers exert influence by directing attention to certain aspects of an environment, thus increasing their saliency.

Even within the individual-group conceptual level, focus on variation in addition to central tendency might lend additional insights (Zalesny & Farace, 1986). For groups with the same average technology use level, social influence pressures on an individual may be stronger when responses are more tightly clustered around that average. Given that low variation in attitudes and behaviors tends to characterize cohesive groups (Seashore, 1954), this prediction would be consistent with the results of this research.

These ideas for potential theoretical convergence, although at this point quite rudimentary, bear further examination. Such an approach would move the field toward a goal of theoretically explaining not only the outcome of social interaction effects, but also the detailed processes by which these effects are produced. Nevertheless, the focus on outcomes has a number of values. First, it permits assessment of social constructivist predictions in general across multiple theoretical perspectives. Second, it avoids the measurement problems in empirically assessing structuration theory that the notion of the duality of structure and action creates. Archer (1982) proposed "analytical dualism" as a potential solution based on the assumption of a virtually instantaneous sequence of action-structure relations. By alternatively punctuating the action-structure sequence from moment to moment, causality can be alternatively assigned to action, then structure, then action,

and so on. Thus, the method can permit assessment of process in structuration without contradicting the core concept of the duality of structure and action. Haines (1988) also suggested that communication network theory and methods offer potential for understanding the duality inherent in structural processes.

Clearly, a great deal more theoretical and methodological groundwork must be completed before researchers can effectively grapple with a multi-level, integrated theory of the social construction of communication technology in organizations. The accomplishment of such a task in the realm of communication technology would promise a possible expansion of the theoretical richness of social interaction perspectives on meaning and action in organizations in general.

REFERENCES

- Aldag, R. J., & Fuller, S. R. 1993. Beyond fiasco: A reappraisal of the groupthink phenomenon and a new model of group decision processes. *Psychological Bulletin*, 113: 533-552.
- Allen, V. L. 1965. Situational factors in conformity. In L. Berkowitz (Ed.), *Advances in experimental social psychology*, vol. 2: 133-175. New York: Academic Press.
- Archer, M. S. 1982. Morphogenesis versus structuration: On combining structure and action. *British Journal of Sociology*, 33: 455-483.
- Back, K. W. 1951. Influence through social communication. *Journal of Abnormal and Social Psychology*, 46: 9-23.
- Bandura, A. 1986. *Social foundations of thought and action*. Englewood Cliffs, NJ: Prentice-Hall.
- Barley, S. R. 1986. Technology as an occasion for structuring: Evidence from observations of CT scanners and the social order of radiology departments. *Administrative Science Quarterly*, 31: 78-108.
- Barley, S. R. 1990. The alignment of technology and structure through roles and networks. *Administrative Science Quarterly*, 35: 61-103.
- Bettenhausen, K. L. 1991. Five years of groups research: What we have learned and what needs to be addressed. *Journal of Management*, 17(2): 345-381.
- Braver, S. L. 1975. Reciprocity, cohesiveness and cooperation in two-person games. *Psychological Reports*, 36: 371-378.
- Contractor, N. S., & Eisenberg, E. M. 1990. Communication networks and new media in organizations. In J. Fulk & C. Steinfield (Eds.), *Organizations and communication technology*: 143-172. Newbury Park, CA: Sage.
- Daft, R. L., & Lengel, R. H. 1984. Information richness: A new approach to managerial behavior and organizational design. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, vol. 6: 191-233. Greenwich, CT: JAI Press.
- Daft, R. L., & Lengel, R. H. 1986. Organizational information requirements, media richness, and structural design. *Management Science*, 32: 554-571.
- Daft, R. L., & McIntosh, N. B. 1981. A tentative exploration into the amount and equivocality of information processing in organizational work units. *Administrative Science Quarterly*, 26: 207-224.

- Deutch, M., & Gerard, H. B. 1955. A study of normative and informational social influence upon individual judgment. *Journal of Abnormal and Social Psychology*, 51: 629-636.
- Dutton, W. H., Rogers, E. M., & Jun, S. 1987. Diffusion and social impacts of personal computers. *Communication Research*, 14: 219-250.
- Evans, N. J., & Jarvis, P. A. 1980. Group cohesion: A review and re-evaluation. *Small Group Behavior*, 11: 359-370.
- Festinger, L. 1953. An analysis of compliant behavior. In M. Sherif & M. O. Wilson (Eds.), *Group relations at the crossroads*: 232-256. New York: Harper.
- Festinger, L., Gerard, H. B., Hymovich, B., Kelley, H. H., & Raven, B. 1952. The influence process in the presence of extreme deviates. *Human Relations*, 5: 327-346.
- Festinger, L., Schachter, S., & Back, K. 1950. *Social pressures in informal groups: A study of human factors in housing*. Stanford, CA: Stanford University Press.
- Fulk, J., & Ryu, D. 1990. *Perceiving electronic mail systems: A partial test of social information processing model of communication media in organizations*. Paper presented at the annual meeting of the International Communication Association, Dublin, Ireland.
- Fulk, J., Schmitz, J. A., & Steinfield, C. W. 1990. A social influence model of technology use. In J. Fulk & C. Steinfield (Eds.), *Organizations and communication technology*: 117-142. Newbury Park, CA: Sage.
- Fulk, J., Steinfield, C. W., Schmitz, J. A., & Power, J. G. 1987. A social information processing model of media use in organizations. *Communication Research*, 14: 542-543.
- Gattiker, U. (Ed.). In press. *Women and technology*. New York: Walter de Gruyter.
- Gerard, H. B. 1954. The anchorage of opinions in face-to-face groups. *Human Relations*, 7: 313-325.
- Giddens, A. 1979. *Central problems in social theory*. Berkeley: University of California Press.
- Gladstein, D. L., & Reilly, N. P. 1985. Group decision making under threat: The tycoon game. *Academy of Management Journal*, 28: 613-627.
- Greene, C. 1976. *Causal connections among cohesion, drive, goal acceptance and productivity in work groups*. Paper presented at the annual meeting of the Academy of Management, Kansas City.
- Haines, V. A. 1988. Social network analysis, structuration theory, and the holism-individualism debate. *Social Networks*, 10: 157-182.
- Hughes, T. P. 1983. *Networks of power: Electrification in western society, 1880-1930*. Baltimore: Johns Hopkins.
- Janis, I. I. 1982. *Groupthink* (2d ed.). Boston: Houghton Mifflin.
- Johansen, R. 1988. *Groupware: Computer support for business teams*. New York: Free Press.
- Jöreskog, K. G., & Sörbom, D. 1989. *LISREL 7 user's reference guide*. Mooresville, IN: Scientific Software.
- Karr, E. B., & Hiltz, S. R. 1982. *Computer-mediated communication systems*. New York: Academic Press.
- Law, J. 1987. Technology and heterogeneous engineering: The case of Portuguese expansion. In W. E. Bijker, T. P. Hughes, & T. Pinch (Eds.), *The social construction of technological systems*: 111-134. Cambridge, MA: MIT Press.
- Levine, J. M., & Moreland, R. 1990. Progress in small group research. In M. R. Rosenzweig & L. W. Porter (Eds.), *Annual review of psychology*, vol. 41: 585-634. Palo Alto, CA: Annual Reviews.

- Levine, J. M., & Russo, E. M. 1987. Majority and minority influence. In C. Hendrick (Ed.), *Review of personality and social psychology*, vol. 8: 13–54. Newbury Park, CA: Sage.
- Lynch, B. P. 1974. An empirical assessment of Perrow's technology construct. *Administrative Science Quarterly*, 19: 338–356.
- McCauley, C. 1989. The nature of social influence in groupthink: Compliance and internalization. *Journal of Personality and Social Psychology*, 57: 250–260.
- McGrath, J. E., & Kravitz, D. A. 1982. Group research. In M. R. Rosenzweig & L. W. Porter (Eds.), *Annual review of psychology*, vol. 33: 195–230. Palo Alto, CA: Annual Reviews.
- McGuire, W. J. 1985. Attitudes and attitude change. In G. Lindzey & E. Aronson (Eds.), *Handbook of social psychology*, vol. 2 (3d ed.): 233–346. New York: Random House.
- MacKenzie, D., & Wajcman, J. 1985. *The social shaping of technology*. Milton Keynes, England: Open University Press.
- McLuhan, M. 1964. *Understanding media: The extensions of man*. New York: McGraw-Hill.
- Markus, M. L. 1988. *Information richness theory, managers, and electronic mail*. Paper presented at the annual meeting of the Academy of Management, Anaheim, CA.
- Moorhead, G. 1982. Groupthink: Hypothesis in need of testing. *Group & Organization Studies*, 7: 429–444.
- Moscovici, S. 1980. Toward a theory of conversion behavior. In L. Berkowitz (Ed.), *Advances in experimental social psychology*, vol. 13: 209–239. New York: Academic Press.
- Nail, P. R. 1986. Toward an integration of some models and theories of social response. *Psychological Bulletin*, 100: 190–206.
- Nemeth, C. J., & Staw, B. M. 1989. The tradeoffs of social control and innovation in groups and organizations. *Advances in Experimental Social Psychology*, 22: 175–210.
- O'Keefe, R. D., Kernaghan, J. A., & Rubenstein, A. H. 1975. Group cohesiveness: A factor in the adoption of innovations among scientific work groups. *Small Group Behavior*, 6: 282–292.
- Pinch, T. J. 1986. *Confronting nature: The sociology of solar-neutrino detection*. Dordrecht: Reidel.
- Poole, M. S., & DeSanctis, G. 1990. Understanding the use of group decision support systems: The theory of adaptive structuration. In J. Fulk & C. Steinfield (Eds.), *Organizations and communication technology*: 173–191. Newbury Park, CA: Sage.
- Poole, M. S., Siebold, D. R., & McPhee, R. D. 1985. Group decision-making as a structural process. *Quarterly Journal of Speech*, 71: 74–102.
- Rasmussen, G., & Zander, A. 1954. Group membership and self-evaluation. *Human Relations*, 7: 239–251.
- Rice, R. E., & Aydin, C. 1991. Attitudes toward new organizational technology: Network proximity as a mechanism for social information processing. *Administrative Science Quarterly*, 36: 219–244.
- Rice, R. R., Grant, A. E., Schmitz, J. A., & Torobin, J. 1990. Individual and network influences on the adoption and perceived outcomes of electronic messaging. *Social Networks*, 12: 27–56.
- Rogers, E. M., & Kincaid, D. L. 1981. *Communication networks: Toward a new paradigm for research*. New York: Free Press.
- Rose, A. M. 1962. *Human behavior and social processes: An interactionist approach*. Boston: Houghton Mifflin.

- Salancik, G. R., & Pfeffer, J. 1978. A social information processing approach to job attitudes and task design. *Administrative Science Quarterly*, 23: 224-253.
- Schmitz, J. 1988. *Electronic communication: A longitudinal view*. Paper presented at the annual meeting of the Academy of Management, Anaheim, CA.
- Schmitz, J. A., & Fulk, J. 1991. Organizational colleagues, information richness, and electronic mail: A test of the social influence model of technology use. *Communication Research*, 18: 487-523.
- Schriesheim, J. F. 1980. The social context of leader-subordinate relations: An investigation of the effects of group cohesiveness. *Journal of Applied Psychology*, 65: 183-194.
- Seashore, S. E. 1954. *Group cohesiveness in the industrial work group*. Ann Arbor, MI: Institute for Social Research.
- Shaw, M. E. 1981. *Group dynamics* (3d ed.). New York: McGraw-Hill.
- Short, J., Williams, E., & Christie, B. 1976. *The social psychology of telecommunications*. London: Wiley.
- Steinfeld, C. W., & Fulk, J. 1986. *Task demands and managers' use of communication media: An information processing view*. Paper presented at the annual meeting of the Academy of Management, Chicago.
- Stogdill, R. M. 1965. *Manual for group dimension description*. Columbus, OH: Bureau of Business Research.
- Stryker, S., & Statham, A. 1985. Symbolic interaction and role theory. In G. Lindsay & E. Aronson (Eds.), *New handbook of social psychology* (3d ed.): 311-378. New York: Random House.
- Trevino, L. K., Lengel, R. H., & Daft, R. L. 1987. Media symbolism, media richness, and media choice in organizations: A symbolic interactionist perspective. *Communication Research*, 14: 553-574.
- Tuckman, B. W. 1965. Developmental sequence in small groups. *Psychological Bulletin*, 63: 384-399.
- Weick, K. E. 1990. Technology as equivoque: Sense making in new technologies. In P. S. Goodman, L. S. Sproull, & Associates, *Technology and organizations*: 1-44. San Francisco: Jossey-Bass.
- Wheaton, B., Muthen, B., Alwin, D. R., & Summers, A. F. 1977. Assessing reliability and stability in panel models. In D. R. Heise (Ed.), *Sociological methodology 1977*: 84-136. San Francisco: Jossey-Bass.
- Wyer, R. S. 1966. Effects of incentive to perform well, group attraction, and group acceptance of conformity in a judgmental task. *Journal of Personality and Social Psychology*, 6: 255-263.
- Zalesny, M. D., & Farace, R. V. 1986. A field study of social information processing: Mean differences and variance differences. *Human Communication Research*, 13: 268-290.

Janet Fulk received a Ph.D. degree in administrative sciences from the Ohio State University and is currently an associate professor of communications management at University of Southern California. Her research interests are in organizational communication technologies, leadership and group process, communication networks, and communication processes in law enforcement.

EFFECTS OF CONTINUANCE, AFFECTIVE, AND MORAL COMMITMENT ON THE WITHDRAWAL PROCESS: AN EVALUATION OF EIGHT STRUCTURAL EQUATION MODELS

STEPHEN J. JAROS

JOHN M. JERMIER

JERRY W. KOEHLER

TERRY SINCICH

University of South Florida

Structural equation modeling was used to evaluate the effects of three forms of attitudinal commitment on employee turnover. We used a traditional dichotomous measure of organizational departure but applied the PRELIS technique to resolve statistical problems. A test of eight competing versions of a turnover model using data collected from employees in an aerospace firm indicated that the forms of commitment affected turnover indirectly through a latent variable measuring withdrawal tendencies. The model including this variable resembles cognitive psychologists' descriptions of human mental processes that emphasize actors' general orientations and a lack of distinction making in everyday life.

The idea that organizational commitment is in some way related to employee turnover has received considerable attention in recent years. Progress in documenting organizational commitment as a correlate of withdrawal process variables is evident from meta-analyses of the research linking these concepts. Cotton and Tuttle (1986) identified organizational commitment as a highly significant ($p < .0005$), negative correlate of turnover on the basis of adding z -values in the 16 samples they reviewed. Mathieu and Zajac (1990) combined data from 26 samples and reported a mean weighted correlation corrected for attenuation between organizational commitment and turnover of $-.28$. Stronger effects were reported on intention to search for job alternatives ($r_t = -.60$, $t = 5$ samples) and intention to leave a job ($r_t = -.46$, $t = 36$ samples), variables believed to mediate the commitment-turnover relationship.

Despite the abundance of research on the relationship between commitment and turnover, important problems hamper understanding of the causal

We gratefully acknowledge the comments of Jeannie Gaines, Robert C. MacCallum, and the reviewers for this journal on an earlier version of this article.

processes involved. First, considerable disagreement about the concept of organizational commitment remains. Commitment theorists remain divided about the dimensionality of attitudinal commitment (Mathieu & Zajac, 1990). Second, disagreement persists concerning the nature of the psychological withdrawal process that employees experience prior to quitting an organization. Mobley, Horner, and Hollingsworth's (1978) model has dominated research in this area (Williams & Hazer, 1986), but recent research has questioned the withdrawal process proposed in that model (Hom & Griffeth, 1991). Third, researchers have questioned the statistical appropriateness of using the path-analytic and structural equation modeling techniques relied on by most researchers to estimate commitment-turnover relationships (Huselid & Day, 1991).

The purpose of this study was to expand understanding of the commitment-turnover relationship through field research. The study's contribution rests on how successfully we addressed the problems outlined above. First, in dealing with the lack of agreement about concepts of commitment, we attempted to integrate the literature by more sharply defining three distinct forms of organizational commitment: continuance, affective, and moral commitment. Second, in dealing with the mixed empirical results based on Mobley and colleagues' (1978) psychological withdrawal model, we specified and compared seven additional, alternative conceptualizations of the withdrawal process linking commitment and turnover. Third, we addressed the issues Huselid and Day (1991) raised pertaining to the use of structural equation models in turnover research by utilizing the PRELIS technique (Jöreskog & Sörbom, 1988). This procedure allowed us to resolve some key statistical problems related to the use of categorical turnover measures in causal modeling.

These steps were taken because it appeared that commitment-turnover research had reached a point at which a comprehensive analysis addressing all these theoretical and methodological issues would be beneficial. The integrative power of structural equation modeling facilitated this attempt at a comprehensive analysis.

THEORETICAL AND METHODOLOGICAL ISSUES IN COMMITMENT-TURNOVER RESEARCH

Concepts of Organizational Commitment

The concept of organizational commitment remains controversial. Disagreement persists about whether commitment is an attitudinal or a behavioral phenomenon (cf. Griffin & Bateman, 1986; Mottaz, 1989; Mowday, Porter, & Steers, 1982; Randall, Fedor, & Longnecker, 1990). Among attitudinal theorists, a consensus is emerging that commitment is multidimensional, but existing research does not completely define the components of commitment nor establish their antecedents and consequences (Allen & Meyer, 1990; McGee & Ford, 1987; Meyer & Allen, 1984; Meyer, Allen & Gellatly, 1990; Penley & Gould, 1988; Randall et al., 1990). Conceptual frag-

mentation is apparent in the proliferation of terms used by commitment researchers to refer to attitudinal commitment; these include value commitment, normative commitment, identification commitment, affective commitment, calculative commitment, and continuance commitment. Lack of conceptual agreement is also apparent in the parallel development of commitment typologies by various researchers (e.g., Allen & Meyer, 1990; O'Reilly & Chatman, 1986). Thus, despite some recent movement toward clarification and consensus, the field remains in need of integrative conceptual work and comprehensive empirical studies.

Continuance commitment. Becker's (1960) side-bet theory has been highly influential in shaping commitment research (e.g., Aranya & Jacobson, 1975; Hrebiniak & Alutto, 1972; Kline & Peters, 1991; Meyer & Allen, 1984; Mottaz, 1989; Ritzer & Trice, 1969; Salancik, 1977; Sheldon, 1971; Stevens, Beyer, & Trice, 1978). This work has developed the idea that the investments, or side bets, an employee makes in an organization, such as time, job effort, and the development of work friendships, organization-specific skills, and political deals, constitute sunk costs that diminish the attractiveness of external employment alternatives. The side-bet notion is consistent with exchange-theory concepts of commitment, according to which commitment develops as a result of an employee's satisfaction with the rewards and inducements an organization offers—rewards that must be sacrificed if the employee leaves the organization (Farrell & Rusbult, 1981; March & Simon, 1958; Mueller, Wallace, & Price, 1992; O'Reilly & Chatman, 1986; Penley & Gould, 1988). The employee feels compelled to commit to the organization because the monetary, social, psychological, and other costs associated with leaving are high.

Although many researchers drawing on Becker's (1960) work have made a behavioral interpretation of the commitment concept (see Mowday and colleagues [1982] for a review), there is no reason to limit development of this concept to the idea that an individual becomes committed to a prior pattern of behavior. Actually, Becker defined commitment as a psychological state "independent of the behavior [it] will serve to explain" (1960: 35). Arguing that Becker's approach emphasized awareness of the costs associated with discontinuing an action, Allen and Meyer (1990) advanced the concept of continuance commitment, a component of their attitudinal model of organizational commitment. A form of psychological attachment to an employing organization, continuance commitment reflects the degree to which an individual experiences a sense of being locked in place because of the high costs of leaving.

Affective commitment. Two counterpoints to the continuance view of commitment have been developed. The most widely discussed form of psychological attachment to an employing organization is affective commitment. The roots of this view lie in the work of Kanter, who defined commitment as "the willingness of social actors to give energy and loyalty to the organization" (1968: 499) and as "the attachment of an individual's fund of affectivity to the group" (1968: 507). In a similar vein, Lee (1971), Buchanan

(1974a, 1974b) and Porter, Steers, Mowday, and Boulian (1974) directed attention to a sense of belonging and the experience of loyalty.

More recently, O'Reilly and Chatman (1986) defined identification commitment as employees' feelings of pride toward and desire for affiliation with an organization, and Allen and Meyer defined affective commitment as an emotional attachment to an organization in which the employee "identifies with and enjoys membership in the organization" (1990: 2). Unlike continuance commitment, in which the attachment may simply reflect a cold calculation of costs and benefits, affective commitment implies the possibility of the formation of an emotional bond.

Although many studies appear to have addressed the domain of affective commitment (e.g., Angle & Perry, 1983; Bateman & Strasser, 1984; Jermier & Berkes, 1979; McGee & Ford, 1987; Morris & Sherman, 1981; Mottaz, 1989; Steers, 1977), almost all research on this topic has conceptualized and measured something in addition to emotional attachment. In research relying on Porter and colleagues' (1974) definition, affective content seems much less important than employees' desire to stay and willingness to exert effort (cf. DeCotiis & Summers, 1987). The third component of Porter's model, identification with an organization's goals and values, drives more current research (Mathieu & Zajac, 1990), but also is not squarely focused on affective content. It seems tied up more with moral beliefs and cognitions than with feelings.

O'Reilly and Chatman (1986) and Allen and Meyer (1990) attempted to delineate the affective domain of organizational commitment empirically by constructing questionnaire items that appeared to tap emotional content. In factor analyses, their items did load cleanly on a dimension reflecting affective commitment. This work began movement toward substantiating a purely affective component of commitment, which coincides with our definition of affective commitment: the degree to which an individual is psychologically attached to an employing organization through feelings such as loyalty, affection, warmth, belongingness, fondness, happiness, pleasure, and so on.

Moral commitment. The other counterpoint to the continuance view of commitment, moral commitment, is based on internalization of norms and identification with organizational authority (Etzioni, 1975). The theme of individuals' incorporating an organization's goals and values into their identities has been central to organizational commitment research, but most researchers developing this theme have not linked their work semantically to a concept of moral commitment (e.g., Angle & Perry, 1983; Bateman & Strasser, 1984; Brown, 1969; Buchanan, 1974a, 1974b; Hall, Schneider, & Nygren, 1970; Morris & Sherman, 1981; Porter et al., 1974; Steers, 1977). Usually, in fact, studies of moral commitment are construed as work on affective commitment (cf. Mathieu & Zajac, 1990; Mowday et al., 1982; Reichers, 1985). When the studies that have tacitly addressed moral commitment are added to the few that have explicitly addressed moral or normative commitment (Gould, 1979; Gould & Penley, 1982; Kidron, 1978; Wer-

bel & Gould, 1984; Wiener, 1982; Wiener & Vardi, 1980), the underestimated importance of this view of organizational commitment becomes apparent.

In more recent work, attempts have been made to emphasize moral commitment and clarify its meaning. Ferris and Aranya (1983) reconceptualized Porter and colleagues' (1974) approach in terms of moral involvement. Penley and Gould (1988), Allen and Meyer (1990), and Randall and colleagues (1990) differentiated moral commitment from other forms and empirically examined it. O'Reilly, Chatman, and Caldwell (1991) defined and measured normative commitment, or congruence between an individual's and an organization's values, and Mayer and Schoorman (1992) defined value commitment as an employee's acceptance of an organization's goals and values. On the basis of this work, we defined moral commitment as the degree to which an individual is psychologically attached to an employing organization through internalization of its goals, values, and missions. This form of commitment differs from affective commitment because it reflects a sense of duty, an obligation, or calling, to work in the organization, but not necessarily emotional attachment. It differs from continuance commitment because it does not necessarily fluctuate with personal calculations of inducements or sunk costs.

One result of the lack of agreement about the meaning of commitment is a conspicuous gap in research modeling the impact of alternative forms of commitment on the withdrawal process (Huselid & Day, 1991). Previous studies have relied on Porter and colleagues' (1974) one-dimensional conceptualization of commitment in predicting turnover (Farkas & Tetrick, 1989; Williams & Hazer, 1986). Recently, several researchers have suggested that alternative forms of commitment might have independent effects on employee turnover (Huselid & Day, 1991; Mathieu & Zajac, 1990; O'Reilly & Chatman, 1986), but there are no published studies of the impacts of continuance, affective, and moral commitment on the withdrawal process. Huselid and Day (1991) included measures of affective and continuance commitment as predictors of turnover but omitted moral commitment. Because moral commitment is based on goals and value congruency between an individual and organization, it seems reasonable to expect that employees experiencing high levels of moral commitment should be less likely to leave their organizations than those who lack such ties (O'Reilly & Chatman, 1986). Even though there is not, presently, a theoretical basis for hypothesizing precise differential effects, it is clear that models estimating multidimensional commitment paths could enhance predictive and explanatory power.

Models of the Withdrawal Process

Mobley, Horner, and Hollingsworth (1978) proposed a linear process model in which an individual's low job satisfaction causes thoughts of quitting an organization, leading to intention to search for other employment, which causes the formation of an intention to leave or stay, and, finally, quitting. Although Mobley and his colleagues focused on job satisfaction as

the precursor to the withdrawal process, other researchers have found that attitudinal commitment plays a key role (e.g., Farkas & Tetrick, 1989; Koch & Steers, 1978; Michaels & Spector, 1982; Mowday, Koberg, & McArthur, 1984; Porter, Crampon, & Smith, 1976; Williams & Hazer, 1986). The full Mobley and colleagues' (1978) model is rarely tested in current research, but trimmed versions and other close approximations are frequently investigated (e.g., Bluedorn, 1982; Farkas & Tetrick, 1989; Hom, Griffeth, & Selaro, 1984; Lee & Mowday, 1987; Miller, Katerberg, & Hulin, 1979; Spencer, Steers, & Mowday, 1983). In the most radical revision, Hom and Griffeth (1991), using confirmatory factor analysis, derived a more parsimonious model of Mobley's (1977) original conceptualization. They concluded that the separate stages of withdrawal may actually be manifestations of an underlying hypothetical construct that they described as a general tendency to withdraw from an organization. In their model, the withdrawal cognitions are reciprocally, not linearly, related. These findings make it clear that a comprehensive test of the commitment-turnover relationship cannot take for granted that Mobley and colleagues' (1978) formulation of the psychological withdrawal process is the definitive way to theorize the intervening states.

Statistical Modeling Issues

Dichotomous measurement of organizational departure also presents some methodological problems for causal modeling. According to Bollen (1989), conducting LISREL or other ordinary-least-squares regression analyses with categorical variables can lead to biased parameter estimates and invalid statistical tests. Huselid and Day (1991) addressed those problems by using logistic regression analysis, the appropriate statistical method to apply when a dependent variable is dichotomous and the independent variables are all directly measurable rather than latent. Although our study involves a dichotomous measure of turnover, we propose several latent constructs for commitment and withdrawal tendency that are not directly measurable. Thus, logistic regression analysis was not appropriate, and we could not use structural equation modeling without addressing the problem of dichotomous measures.

To circumvent these statistical problems while retaining such advantages of structural equation modeling as latent variable estimation, explicit accounting of measurement error, and sophisticated evaluation of competing models, we followed Bollen's (1989) recommendations and analyzed our data using the PRELIS technique (Jöreskog & Sörbom, 1988). In addition to the usual Pearson product-moment correlations computed between continuous variables, polyserial correlations are also computed with this technique. The dichotomous nature of the turnover variable requires that polyserial correlations between turnover and the continuous organizational commitment and withdrawal process variables be computed. The adjusted correlation matrix, consisting of both product-moment and polyserial correlations, can then be used as an input to LISREL for causal analysis.

Models of the Commitment-Turnover Relationship

Eight structural equation models were specified to estimate the unique effects of all three forms of commitment on turnover, mediated by withdrawal cognitions (see Figures 1–8). Because of model equivalence and other mathematical problems involved in structural equation estimation (cf. MacCallum, Wegener, Uchino, & Fabrigar, 1993), it is important to have a strong rationale for each model tested. According to Bollen (1989, 1992), a model can be justified with reference to established theory or by relying on theoretical logic, previous research, statistical reasoning, or any combination of those factors.

Model 1: Traditional theory. This is a modification of Mobley and colleagues' (1978) turnover model. Affective, continuance, and moral commitment replace job satisfaction as the direct precursors of withdrawal. Another change is that the commitment constructs are specified as latent variables and estimated with confirmatory factor analysis. It is hypothesized that losses of each type of commitment directly contribute to an employee's thinking of quitting, which leads to intent to search for job alternatives, which leads to intent to leave the present employer, which affects employee turnover. In this model, commitment affects turnover indirectly.

Model 2: Three withdrawal variables trimmed. As Porter and coauthors (1974) proposed, this model specifies direct effects between each form of commitment and turnover, with no intervening withdrawal variables.

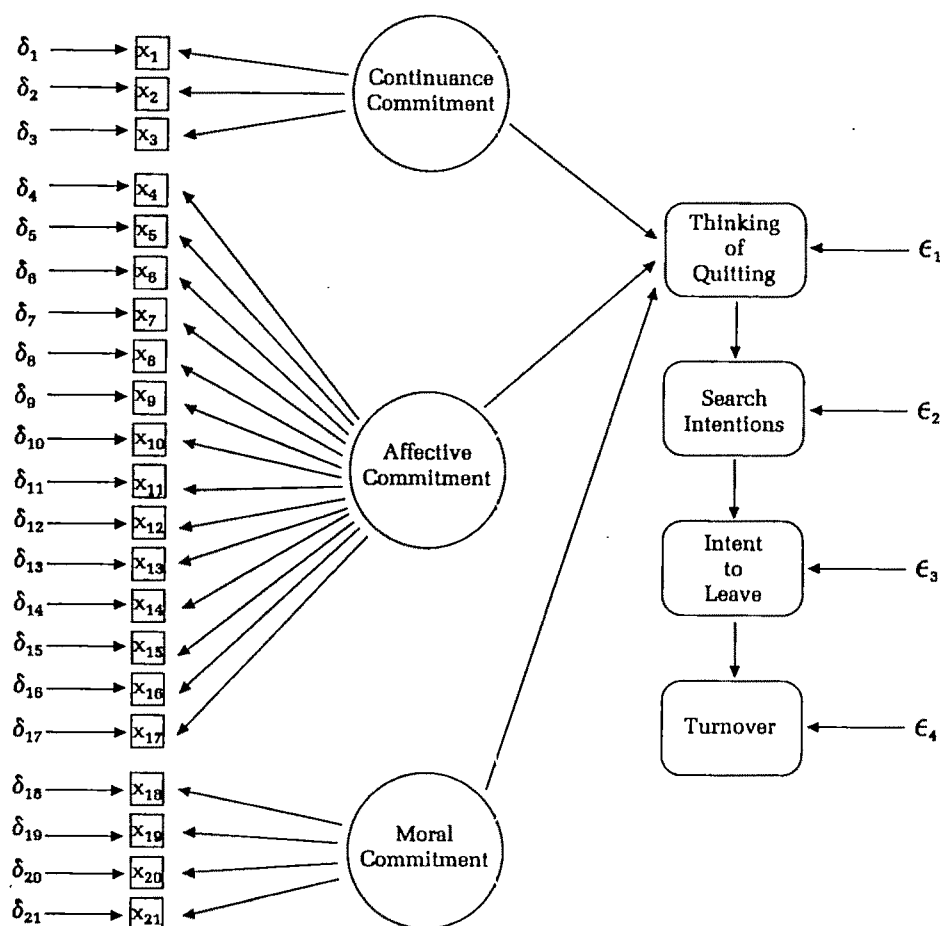
Model 3: Thinking of quitting, search trimmed. Recent studies have posited that only an intent-to-leave stage separates the forms of organizational commitment and the decision to quit (e.g., Farkas & Tetrick, 1989; Mueller, Wallace, & Price, 1992; Williams & Hazer, 1986). This model tests for the possibility that the withdrawal process consists of one intervening variable, intent to leave.

Model 4: Search trimmed. This model is identical to model 1 except that a direct path is specified from thinking of quitting to intent to leave, trimming the search intentions variable. Spencer, Steers, and Mowday (1983) reported evidence that individuals' thinking of quitting may directly lead to their forming an intent to leave an organization.

Model 5: Thinking of quitting trimmed. Bluedorn (1982) posited that Mobley and colleagues' (1978) model could be improved by trimming thinking of quitting. Accordingly, this model specifies direct effects between the commitment variables and intent to search, eliminating thinking of quitting.

Model 6: Spurious correlation. This model represents the relationships among thinking of quitting, intent to search, and intent to leave as spurious correlations resulting from their joint dependence on the three forms of commitment. In this case, observed bivariate correlations are treated as statistical artifacts that disappear when joint effects of the forms of commitment are controlled. If this model cannot be rejected, then the notion of causality among the withdrawal variables is suspect (cf. Bollen, 1989).

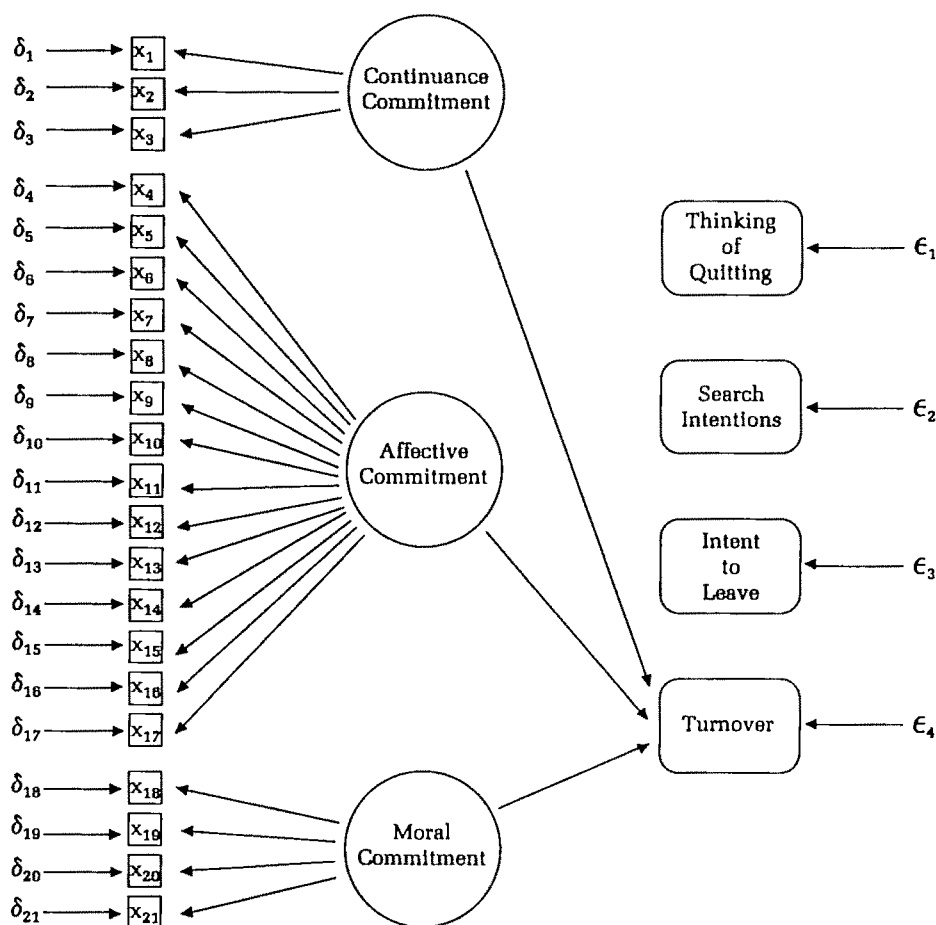
FIGURE 1
Model 1: Traditional Theory^a



^a δ and ϵ = error terms.

Model 7: Reciprocal causality. This model is specified by relaxing the theoretical assumptions of recursivity among the psychological withdrawal variables (cf. Mobley et al., 1978). Rather than specifying sequential stages of withdrawal, this model specifies reciprocal relationships among the withdrawal process variables. A counterpart of this formulation can be found in the concept of ruminative thought (Martin & Tesser, 1989), a repetitive mental process whereby a person becomes fixated on cognitions associated with a frustrated goal. As a response to declining organizational commitment, an employee may ruminate, bouncing from one withdrawal cognition to another. In discussing their findings, Hom and Griffeth (1991) speculated that withdrawal cognitions may be reciprocally related.

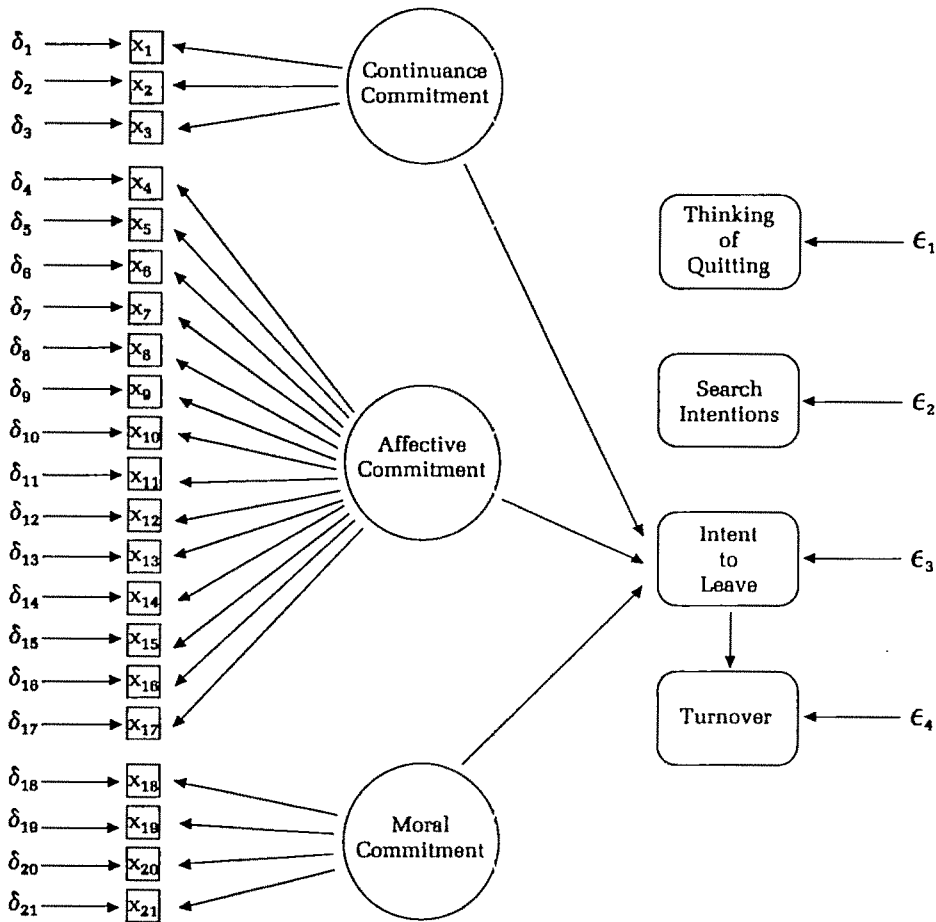
FIGURE 2
Model 2: Three Withdrawal Variables Trimmed^a



^a δ and ϵ = error terms.

Model 8: Constrained latent correlation. This model represents the withdrawal variables as indicators of an unmeasured latent factor—withdrawal tendency. It closely resembles cognitive psychologists' descriptions of human mental processes that emphasize vague, general orientations and a lack of distinction making in everyday life (cf. Langer, 1978; Markus & Zajonc, 1985; Schneider, 1991; Sherman, Judd, & Park, 1989). Hom and Griffeth (1991) found evidence that the separate withdrawal variables in the Mobley (1977) model may be better understood as components of a general predisposition to withdraw from an organization. Miller, Katerberg, and Hulin (1979) and Mowday, Koberg, and Macarthur (1984) made similar arguments about Mobley and colleagues' (1978) model. Thus, model 8 specifies

FIGURE 3
Model 3: Thinking of Quitting, Search Trimmed^a



^a δ and ϵ = error terms.

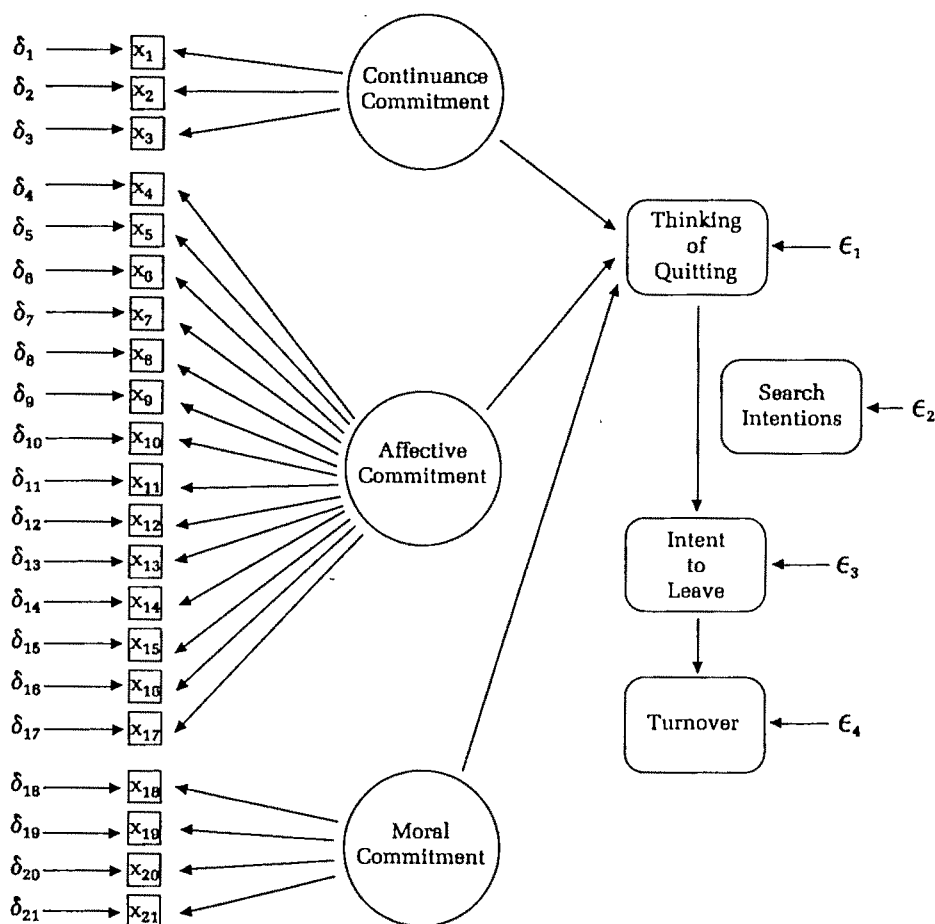
that a change in an individual's level of commitment will affect formation of an overall tendency to withdraw from or stay with an organization. The withdrawal tendency underpins more specific withdrawal concepts that derive their relationships from this source. Contrary to traditional theory, turnover is unrelated to the three measured withdrawal variables. Instead, it depends most directly on the unmeasured withdrawal tendency variable.

METHODS

Data, Context, and Procedures

This study is based on data obtained from 270 employees of an aerospace firm located in a major metropolitan area in the southeastern United

FIGURE 4
Model 4: Search Trimmed^a

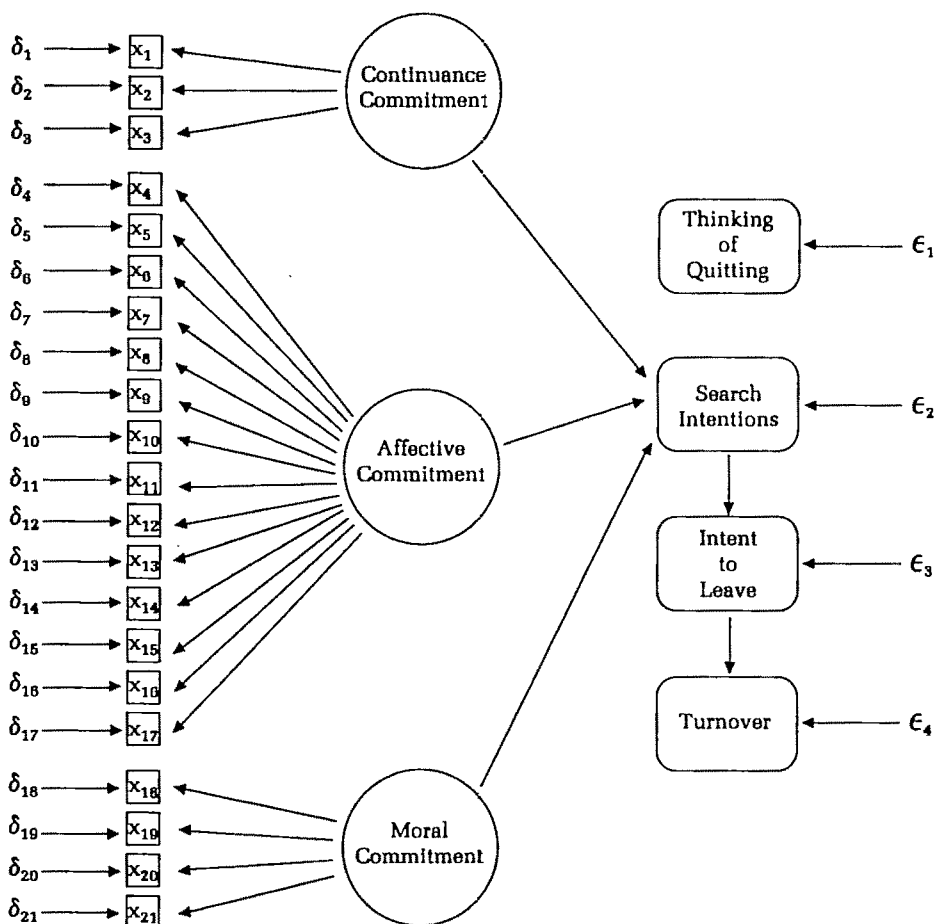


^a δ and ϵ = error terms.

States. The firm was a wholly owned American subsidiary of a multinational corporation, with revenues of \$700 million per year and 20,000 employees, headquartered in London. The firm's primary customer was the U.S. government, but it subcontracted with McDonnell Douglas, General Dynamics, Martin Marietta, Boeing, and other major suppliers of military products. It operated at the leading edge of military aerospace technology in designing, manufacturing, and marketing aviation components such as electronic flight instrument systems, weapons-aiming computers, and radar display units. It also repaired and overhauled military aviation equipment. The firm's revenues exceeded \$20 million in the year prior to the study.

The firm was divided into nine functional areas: marketing, program

FIGURE 5
Model 5: Thinking of Quitting Trimmed^a

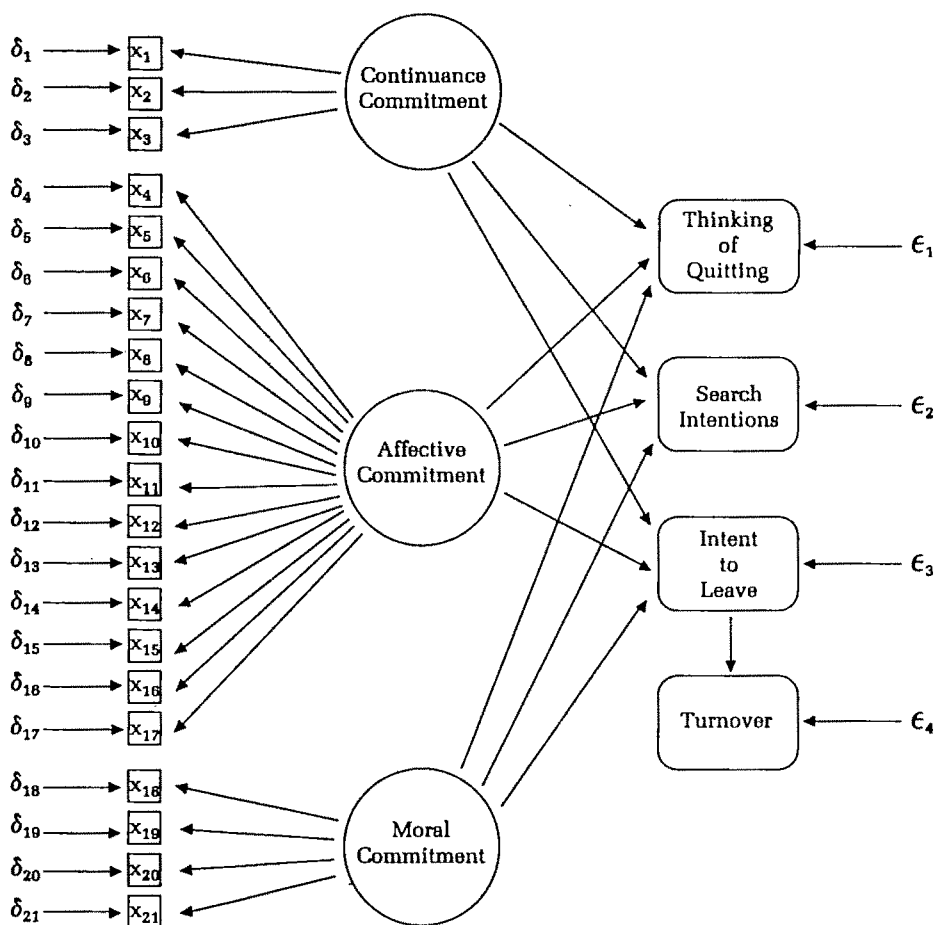


^a δ and ϵ = error terms.

management, engineering, manufacturing, quality assurance, employee relations, management information, financial control, and repair and overhaul. With the exception of repair and overhaul, interdependence among the units was high. Several formal linking mechanisms, such as liaison roles, task forces, and integrating positions (program directors) were in place to augment vertical coordination. Engineering and marketing used a matrix structure to provide the basic groups needed to undertake a project.

At the time of the study, top management in the firm was concerned with rising discontent among operatives in the repair and overhaul group, the area most responsible for generating revenue growth and maintaining financial ratios. After experiencing major problems with cost overruns, mar-

FIGURE 6
Model 6: Spurious Correlation^a

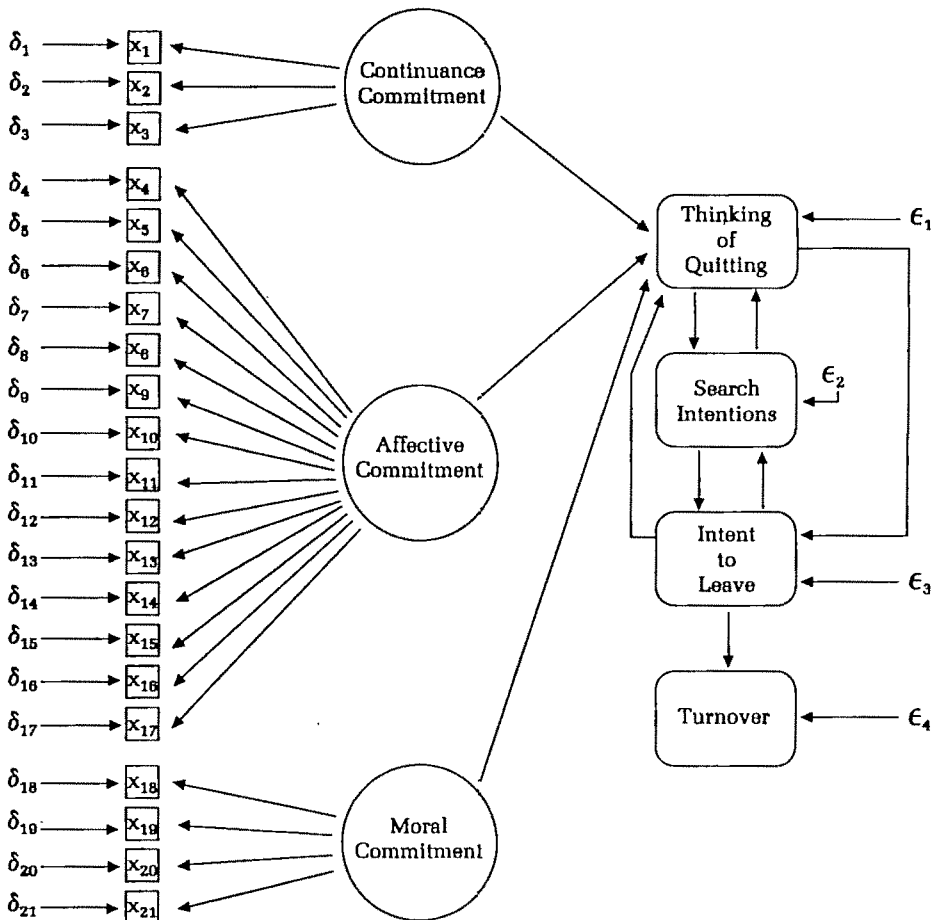


^a δ and ϵ = error terms.

keting failures, and employee layoffs earlier in the decade, top management was under extreme pressure from the parent corporation to succeed financially. Invited to consult on the emerging problems in the repair and overhaul group, we designed a multimethod study to address the issues in repair and overhaul that naturally allowed organization-wide analysis and comparisons. This article draws on a portion of the resulting data to evaluate alternative models of the organizational commitment-withdrawal process.

Approximately four weeks prior to collection of questionnaire data, intensive, semistructured interviews were conducted with 62 employees (about 21 percent of the firm's members). Interviews were conducted at the workplace during normal working hours and required from 30 minutes to

FIGURE 7
Model 7: Reciprocal Causality^a

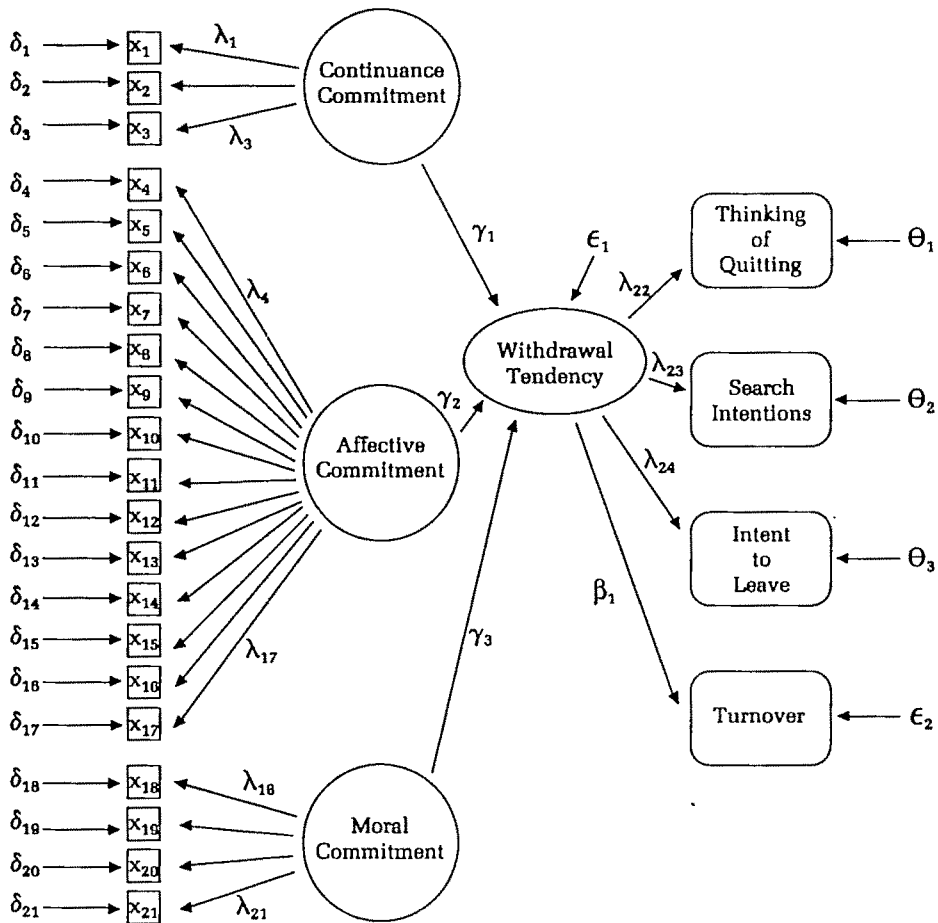


^a δ and ϵ = error terms.

three hours to complete. We used the interview data to generate items for the questionnaire, to explain the study to employees, and to help us interpret quantitative results. Prior to the interviews, we distributed a letter from the firm's general manager to all employees. It guaranteed them total confidentiality and encouraged them to be candid and sincere in their responses. We supplemented interviews by several partial days of on-site observation to develop an understanding of the firm's products, physical layout, task interdependencies, and so forth, and to build rapport with employees.

After completing these activities, we designed a questionnaire and administered it to 92 percent of the firm's employees (270 of 293) during normal working hours. Completion time was between 75 and 100 minutes,

FIGURE 8
Model 8: Constrained Latent Correlation^a



^a δ , ϵ , and Θ = error terms; β , γ , and λ = path coefficients.

including the time taken to explain the study and the survey. Respondents were assured of total confidentiality. Turnover data were collected 99 weeks after the survey. At that time, 48 respondents had voluntarily left the firm. Multivariate analyses were conducted on data from 265 individuals as 5 respondents missed questionnaire items or did not leave the firm voluntarily and were thus deleted from the analyses.

Sixty-eight percent of the respondents were men. Their average age was about 35 years (one-third were 30 years old or younger, and one-fourth were older than 45 years). Eighty-one percent had completed schooling beyond high school, 16 percent held college diplomas, and an additional 15 percent had begun graduate study or earned graduate degrees. Forty-two percent had

been with the firm 2 years or less, another 44 percent had between 2 and 10 years tenure, and 14 percent had more than 10 years. Thirty-six percent had served in the military. Twenty-two percent were engineers, 22 percent were technicians, 17 percent were hourly workers, mostly assigned to manufacturing, 23 percent were clerical and support workers, and 16 percent were administrative, managerial, or supervisory employees (all percentages are approximate).

The questionnaire included 16 items measuring demographic characteristics, 207 items measuring descriptions of and reactions to work, and an open-ended question concerning the firm's strengths and weaknesses. Theoretical considerations and obligations to provide detailed feedback to employees determined the questionnaire's length. Given the high education level of the respondents, their apparent desire to participate in the study, and the flexibility top management showed in releasing employees from work responsibilities for 90 minutes, we designed the survey to gather data for more than one purpose.

Commitment Measures

The continuance form of organizational commitment was measured with two items developed by Meyer and Allen (1984) and one item written for this study; all appear in the Appendix. We chose the items to capture the idea of sunk costs and investments while not confounding the concept with options and alternatives available. McGee and Ford (1987) reported that the Meyer and Allen scale consists of two subscales, one measuring the sacrifices that an individual must make to leave an organization, the other measuring the options and alternatives the individual perceives. Becker's (1960) notion of side bets can be assessed with sacrifice items. Responses were made on seven-point scales ranging from 1, "strongly disagree" to 7, "strongly agree." One of the items was reverse-scored. In previous research (Allen & Meyer, 1990; Meyer & Allen, 1984), the continuance commitment scale was unrelated to affective and moral commitment measures. In this study, it had an alpha coefficient of .77.

The moral form of organizational commitment was measured with four items developed by Gould and Penley (1982) and Werbel and Gould (1984). The items (see Appendix) reflect a sense of duty and dedication to an organization and its mission. Responses were made on seven-point scales (1 = strongly disagree, 7 = strongly agree). Wiener and Vardi (1980) took a similar approach, writing their three-item scale to reflect normative beliefs about loyalty, self-sacrifice, and uncritical acceptance. However, from the limited item analysis they reported, it appeared that their scale had low internal consistency. Also, with the inclusion of the loyalty item, it tapped the affective domain. Allen and Meyer's (1990) normative commitment scale was not available when the study was conducted, but their items appear to overlap considerably with concepts of staying and leaving. For testing commitment-withdrawal models, it was preferable to avoid this degree of over-

lap. Therefore, we chose the Gould scale; in this study, its alpha coefficient was .83.

The affective form of organizational commitment was measured with 14 bipolar adjective items written for this study (cf. Jermier & Gaines, 1989). Using a seven-point scale, respondents were asked to report the feelings they usually experienced when thinking of their employing organization. Sample items include sadness-happiness, pleasure-pain, anger-peace, and loyalty-disloyalty. Five of the items were reverse-scored. We developed this scale for two reasons. First, Allen and Meyer's (1990) three-factor conceptualization of commitment had not yet been published. Meyer and Allen (1984) measured a concept of affective commitment, but it included items that appeared to overlap with intent to leave or stay. The other available scales included items that overlapped with moral commitment (e.g., Buchanan, 1974a; Porter et al., 1974), or attempted to construe affective commitment in terms of alienation (Penley & Gould, 1988), or had not been replicable in factor analyses (O'Reilly, Chatman, & Caldwell, 1991). Second, all existing measures utilized a Likert format, thereby tapping cognitive beliefs about emotional attachments more than the feelings themselves (cf. Ajzen & Fishbein, 1980). Although there is usually a strong relationship between beliefs and feelings toward a referent, the bipolar adjective scale should have enabled measurement of a more purely affective domain of experience. The scale's items appear in the Appendix; in this study, its alpha coefficient was .94.

Validation Studies

Two separate validation studies were conducted, primarily to assess the psychometric properties of the affective commitment scale. One was conducted at a firm located in the northeastern United States, similar to the firm in which the original study was conducted, and owned by the same multinational aerospace corporation. Data were collected from employees with demographic characteristics similar to those of the engineers, technicians, and clerical workers in the original study. The second validation study was conducted with a group of part-time M.B.A. students who were employed in a wide variety of organizations. In both studies, two waves of data were collected from the same respondents, with a one-month interval between waves. Although we did not conduct a full-blown construct validation study, the information gained from these studies provided considerable support for the validity of the affective commitment scale. More detail about sample characteristics, procedures, and results is available from us. The results of the validation studies appear in Tables 1, 2, 3, and 4.

Using data collected from the original study, the second study (first wave), and the third study (first wave), Table 1 reports correlations between the affective commitment scale and variables that previous researchers (Mathieu & Zajac, 1990) have identified as correlates of affective commitment. The results from all three studies show that the affective commitment scale correlates with these variables in the direction and to the degree ex-

TABLE 1
Correlates of the Affective Commitment Scale^a

Correlates	Original Study	First Validation Study	Second Validation Study
Affective commitment ^b		.76**	.76**
Moral commitment ^b		.28*	.28*
Continuance commitment ^b		.02	.12
Role conflict ^c	-.40**	-.58**	-.37**
Role ambiguity ^c	-.48**	-.53**	-.33**
Thinking of quitting ^d	-.58**	-.56**	-.55**
Search intentions ^d	-.51**	-.38**	-.38**
Intent to quit ^e	-.54**	-.42**	-.43**

^a Ns were 270, 165, and 164 for the original study and first and second validation studies, respectively.

^b Allen and Meyer (1990).

^c House and Rizzo (1972).

^d Mobley, Horner, and Hollingsworth (1978).

^e Bluedorn (1982).

* $p < .05$

** $p < .01$

pected. The affective commitment scale is strongly and positively correlated with Allen and Meyer's (1990) measure of affective commitment. It is modestly and positively correlated with the moral commitment measure and is unrelated to the continuance commitment measure. The affective commitment scale is highly and negatively correlated with House and Rizzo's (1972) measures of role conflict and role ambiguity, two important antecedents of affective commitment (Mathieu & Zajac, 1990), and is highly and negatively correlated with three withdrawal tendency variables: thinking of quitting, search intentions, and intent to quit, which are theorized as outcomes of loss of affective commitment. These correlations provide evidence that the affective commitment scale is related to measures of other constructs congruent with the proposed theoretical relationships.

Since common method variance bias could inflate these relationships, we computed cross-lagged correlations in the two validation studies. Tables 2 and 3 report these. In both studies, we found very strong support for the proposed relationships between affective commitment and role conflict, role ambiguity, thinking of quitting, search intentions, and intent to quit. Although this support does not completely eliminate the possibility of common method variance bias, since the questionnaire method was used both times, it does show clearly that the affective commitment correlations were not produced solely through priming or other artifactual means.

In addition, we conducted principal axes factor analyses with "varimax" rotation on the data from the two validation studies to estimate the factor structure of the affective commitment scale. The purpose of these factor analyses was to determine if the affective commitment scale measured a separate type of commitment or if the construct measured was confounded

TABLE 2
Time-lagged Correlations: Antecedents of Affective Commitment^a

Antecedents	Affective Commitment, First Validation Study, Time 2	Affective Commitment, Second Validation Study, Time 2
Role conflict		
First validation study, time 1	-.65**	
Second validation study, time 1		-.28**
Role ambiguity		
First validation study, time 1	-.60**	
Second validation study, time 1		-.32**

^a Ns = 121, first validation study; 149, second validation study.

** p < .01

with moral or continuance commitment. The results (Table 4) clearly reveal a three-factor solution for each set of analyses across both data sets. Eigenvalues were 7.6, 2.2, and 1.3 for the first validation study, with 54 percent of the total variance explained, and 8.2, 1.7, and 1.1 for the second study, with 52 percent of the total variance explained. The three factors consist of the separate measures of affective, moral, and continuance commitment. We also performed additional factor analyses comparing the affective commitment scale to Allen and Meyer's (1990) moral and continuance commitment measures, with similar results (these results are not reported but are available from the authors). These findings replicate the results from the factor analyses performed for the original study (Table 7).

The results of the two auxiliary studies support the validity of the affective commitment scale. The results of the factor analyses suggest that the scale is clearly distinguishable from measures of other forms of commitment. The correlational analyses suggest that it is closely related to, but not redun-

TABLE 3
Time-lagged Correlations: Outcomes of Affective Commitment^a

Outcomes	Affective Commitment, First Validation Study, Time 1	Affective Commitment, Second Validation Study, Time 1
Thinking of quitting		
First validation study, time 2	-.63**	
Second validation study, time 2		-.65**
Search intentions		
First validation study, time 2	-.44**	
Second validation study, time 2		-.47**
Intent to quit		
First validation study, time 2	-.44**	
Second validation study, time 2		-.50**

^a Ns = 121, first validation study; 149, second validation study.

** p < .01

TABLE 4
Results of Factor Analysis, Validation Studies^a

Dimensions	Variables ^b	First Validation Study			Second Validation Study		
		Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3
Continuance commitment	x ₁	.07	.00	.82	-.00	.07	.74
	x ₂	.05	.06	.83	.05	.03	.94
	x ₃	-.09	.04	.31	-.05	.02	.13
Affective commitment	x ₄	.74	.24	-.02	.77	.16	-.01
	x ₅	.55	.33	-.22	.66	.21	-.02
	x ₆	.53	.03	.13	.65	.18	-.07
	x ₇	.61	.40	.13	.66	.04	.08
	x ₈	.29	.07	.08	.46	.18	-.11
	x ₉	.32	.39	-.10	.52	.38	-.11
	x ₁₀	.78	.33	-.00	.78	.26	-.04
	x ₁₁	.73	.24	-.00	.78	.33	-.03
	x ₁₂	.59	-.06	-.01	.66	.04	.08
	x ₁₃	.70	.35	-.10	.66	.24	-.11
	x ₁₄	.70	.11	-.10	.72	.10	-.01
Moral commitment	x ₁₅	.65	.08	-.08	.72	.24	-.00
	x ₁₆	.78	.11	-.10	.79	.11	-.03
	x ₁₇	.67	.25	-.11	.73	.24	-.08
	x ₁₈	.01	.66	.00	.17	.70	.09
	x ₁₉	.23	.71	.10	.16	.66	.10
	x ₂₀	.15	.75	.08	.35	.68	.08
	x ₂₁	.31	.45	.02	.37	.45	.07

^a Boldface indicates factor loadings greater than .40. Ns = 165 and 164, first and second validation study, respectively.

^b Descriptions of the variable items appear in the Appendix.

dant with, the widely used Allen and Meyer (1990) measure of affective commitment. The correlational analyses also show that the affective commitment scale is correctly related to theoretical correlates of affective commitment. Although these results do not confirm the validity of the affective commitment scale, since scale validation is an ongoing process, and even the strongest validation is subject to refutation in future studies, the strong, consistent findings reported across three studies provide preliminary evidence of validity. In our primary study, the scale had an alpha coefficient of .94; in the first validation study (first wave), alpha equaled .92; and in the second validation study (first wave), alpha was .94.

Other Measures

Thinking of quitting the organization and intention to search for a new job, two aspects of the withdrawal tendency concept, were measured with single items written by Mobley and colleagues (1978). Responses to both were made on five-point scales (1 = never, 5 = constantly; and 1 = very unlikely, 5 = certain). Bluedorn's (1982) two items were used to measure intent to leave. The simplicity and straightforwardness of withdrawal ten-

dency variables has led researchers to rely on one- and two-item measures. Although such measures often lack reliability, this does not appear to be the case here. During the two validation studies, we also gathered data to assess the reliability of these items, obtaining the following test-retest correlations: thinking of quitting, .71, first validation study, .78, second validation study ($p < .01$); search intentions, .70 and .69 ($p < .01$); and intent to quit, .78 and .77 ($p < .01$).

Ordinarily, measurement of turnover is uncomplicated: employees sign questionnaires administered for research purposes, and the researchers check personnel records months or years later to determine respondents' employment status. If an employee has left, the turnover criterion is coded 1; if the employee stayed, the turnover criterion is coded 0. Because of the prevailing climate in the focal organization at the time of the study, we decided that the questionnaire data would be more useful if no names were requested. Instead, we asked respondents to put an identifying word on the front page of their survey that would be meaningful to them without revealing their identity to others (for instance, mother's maiden name). When an employee left the firm, the employee relations director asked for the identifier used on the survey during the exit interview. In the few cases in which an employee could not remember the term used, it was possible to match demographic data from the survey with personnel records to identify the respondent. The 48 respondents who had voluntarily left the firm after 99 weeks were coded with 1. Those who remained were coded with 0.

Analyses

Means, standard deviations, internal consistency estimates and bivariate correlations were calculated. Then, using LISREL, we performed weighted-least-squares estimation of seven structural equation models and compared the results. As a supplement to the confirmatory factor analysis component of LISREL, principal axes factor analysis, with both orthogonal and oblique rotation, was used to determine the dimensionality of the organizational commitment construct.

Identification of models. Before attempting to estimate models, we needed to determine if unique values existed for the unknown model parameters. This requirement is commonly known as the identification step in structural equation modeling. A model is identified if all unknown parameters can be written as algebraic functions of the elements of the sample covariance matrix of observed variables. Identified (or overidentified) models have sufficient information available in the sample covariance matrix to uniquely estimate the model parameters. An underidentified model has at least one unidentified parameter, indicating that insufficient information is available in the sample covariance matrix to estimate the model's parameters. Upon scaling the latent commitment variables, by constraining the path coefficient for one of the observed variables to one for each latent variable, we could apply the recursive rule (cf. Bollen, 1989) to establish that models

1 through 6 and model 8 were identified (actually, overidentified). Model 7, however, was underidentified and, unfortunately, could not be estimated in this study.

Evaluation of models. The seven structural models identified were fit and analyzed with the LISREL 7 software package (Jöreskog and Sörbom, 1988). The PRELIS-adjusted sample covariance matrix, based on complete data ($N = 265$ cases) for the 25 observed variables (21 commitment variables and 4 turnover variables), was inputted to LISREL. Weighted-least-squares estimation was used to obtain estimates of the path coefficients.

LISREL automatically provides four goodness-of-fit measures: the chi-square statistic,¹ the root mean square residual (RMSR),² the goodness-of-fit index (GFI), and the adjusted goodness-of-fit index (AGFI).³ Each of these statistics measures how well the reproduced covariance matrix, based on the specified constraints, estimates the observed (sample) covariance matrix. However, each measure has its drawbacks.

Several researchers (e.g., Bentler & Bonett, 1980; Bollen, 1989; Browne & Cudeck, 1989; Mulaik, James, Van Alstine, Bennett, Lind, & Stilwell, 1989) have warned that analysts must exercise caution when using the chi-square test. For models with slight departures from the null hypothesis or for data that deviate from strict multivariate normality even when the null is true, the chi-square test will often be highly significant, implying that the analyst cannot accept the model as the perfect fit. Further examination of the model's residuals often reveals that the rejected model is adequate from a practical standpoint. Bollen (1989) showed that the value of the RMSR can be distorted when the observed variables are measured in different units. In this study, the dichotomous variable measuring organizational departure has a much smaller variance than any of the other observed variables; hence, the RMSR may be misleading. Though they are typically greater than zero, both the GFI and the AGFI can be negative. As Mulaik and colleagues noted, "A negative AGFI may be diagnostic of a poor model . . . , but because 0 and

¹ For multivariate normal data, the chi-square statistic provides the most rigorous test of a model. The null hypothesis is $\Sigma = \Sigma(\Theta)$, where Σ is the true covariance matrix and $\Sigma(\Theta)$ is the covariance matrix reproduced by the model. This is equivalent to testing whether the overidentifying restrictions of the model are valid. The observed significance level (p -value) of the test is the probability of obtaining a chi-square value larger than the calculated value if the null hypothesis is true. The higher the p , the closer the model is to the perfect fit, $\Sigma = \Sigma(\Theta)$.

² The RMSR is the square root of the average of the squared residuals, where the residuals are the differences between the corresponding elements in the covariance matrix reproduced by the model and the sample covariance matrix. Ideally, RMSR will be near zero for well-fitting models.

³ The GFI measures the relative amounts of variance and covariance in a sample covariance matrix that a model predicts, and the AGFI adjusts for the degrees of freedom of the model relative to the number of variables (for further details, see Jöreskog and Sörbom [1988]). Both indexes reach their maximum of one when the sample covariance matrix equals the covariance matrix reproduced by the model; consequently, the closer these values are to one, the better the fit.

negative values have no rationale in the formulation of the AGFI, it is difficult to know what further interpretation to give them" (1989: 440).

Given the potential problems with these four measures, we calculated several additional goodness-of-fit indexes designed to allow us to compare the fit of two nested models: Bentler and Bonett's (1980) normed fit index (NFI), which measures the improvement in fit for the model in question relative to some baseline, or more restrictive, model; the parsimonious normed fit index (PNFI), suggested by James, Mulaik, and Brett (1982), which adjusts the NFI for degrees of freedom; the parsimonious goodness-of-fit index (PGFI), proposed by Mulaik and colleagues (1989), which adjusts the GFI for degrees of freedom;⁴ and the relative normed fit index (RNFI), an index designed to assess the relative fit of the structural relationships among the latent variables proposed in a model independent of the measurement portion of the model (Hertzog, 1990; Lerner, Hertzog, Hooker, Hassibi, & Thomas, 1988; Mulaik et al., 1989).

Many analysts are unaware that the goodness of fit of the measurement portion of a model—the portion of the model relating the latent factors to the observed variables—can heavily influence the GFI, AGFI, PGFI, NFI, and PNFI. This occurs when most of the parameters being estimated relate the latent to the observed variables, as in this study. The structural portion of the model, or the portion proposing causal relationships among the latent variables, can be seriously misspecified, yet the GFI for the overall model can be in the high .80s and .90s. (See Mulaik et al. [1989] for an example.) The RNFI represents an attempt to circumvent this problem by comparing the candidate model to both a confirmatory factor analysis model, model 9, which includes uncorrelated latent variables,⁵ and a fully saturated latent variable model, model 10.

Two baseline models were used to calculate the NFI and PNFI. Typically, a model in which no correlations among the observed variables are postulated—the null model—is used as the baseline. For this study, we denoted the indexes corresponding to the null model as NFI_0 ⁶ and $PNFI_0$.⁷ Sobel and Bohrnstedt (1985) argued that using the null, or no-factor, model in the calculation of the NFI and PNFI may give an inflated notion of the

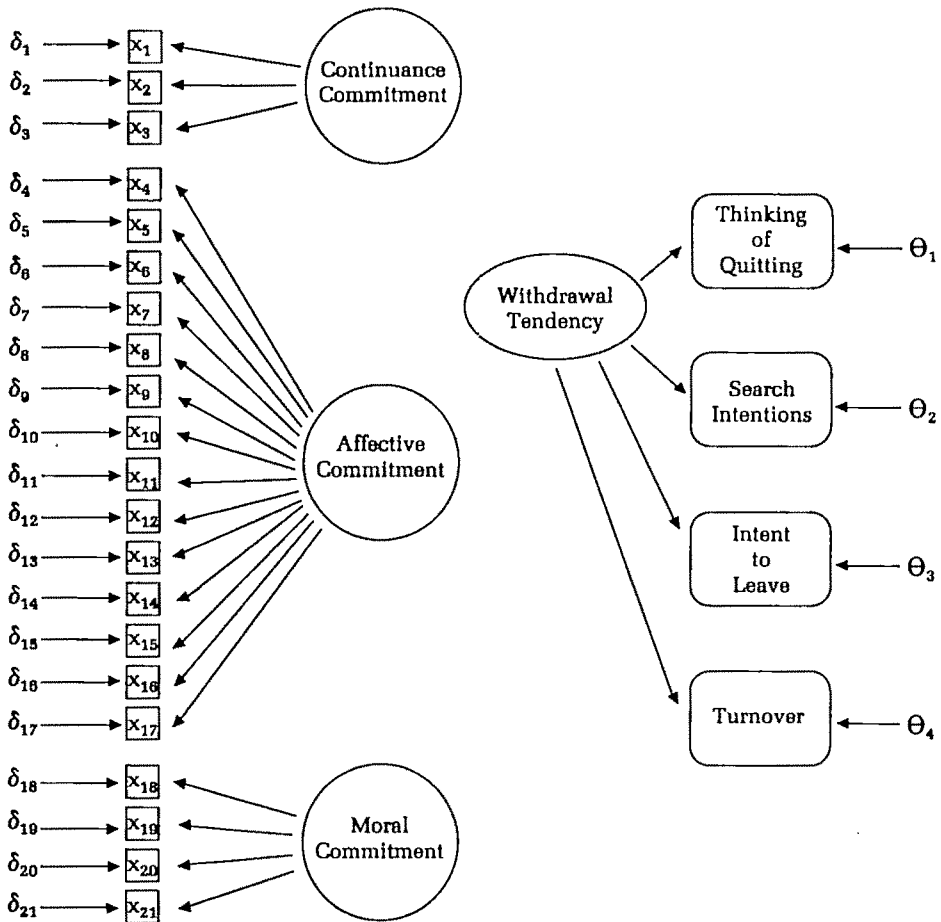
⁴ By definition, $PGFI = [2 \times df_{\text{model}} / (k(k - 1))] \times GFI$, where k is the number of observed variables. In this study, $k = 25$.

⁵ By definition, $RNFI = [(\chi^2)_9 - (\chi^2)_{\text{model}}] / [(\chi^2)_9 - (\chi^2)_{10} - (df_{\text{model}} - df_{10})]$, where $(\chi^2)_9$ is the chi-square for model 9, the confirmatory factor analysis model, and $(\chi^2)_{10}$ is the chi-square for model 10, the fully saturated latent variable model.

⁶ By definition, $NFI_0 = [(\chi^2)_{\text{null}} - (\chi^2)_{\text{model}}] / [(\chi^2)_{\text{null}} - df_{\text{model}}]$. Since $(\chi^2)_{\text{null}}$ will always exceed $(\chi^2)_{\text{model}}$, $0 < NFI_0 < 1$. The closer the NFI_0 is to one, the greater the percentage improvement in fit for the model.

⁷ By definition, $PNFI_0 = (df_{\text{model}} / df_{\text{null}}) \times NFI_{\text{model}}$. A drawback of the GFI, AGFI, and NFI is that all three fit indexes must increase as more parameters are estimated. Consequently, an analyst can get fit indexes approaching one by simply freeing up more parameters in a model. The PNFI will increase as more parameters are estimated only up to a point and will begin to decrease as additional degrees of freedom are lost.

FIGURE 9
Model 9: Confirmatory Factor Analysis Model^a

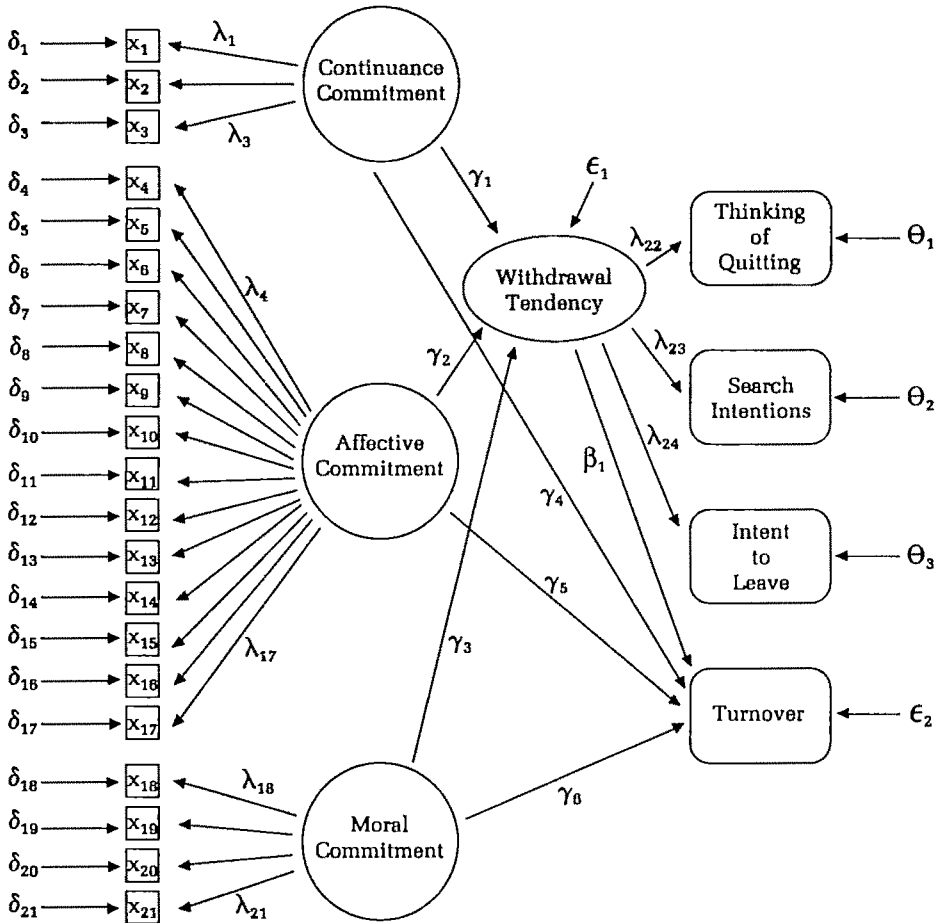


^a δ and Θ = error terms.

percentage improvement in fit and suggested that a more realistic baseline model be used. Since all seven models analyzed in this study specify a three-factor model for the observed commitment variables, a more reasonable baseline is model 11 shown in Figure 11. The only relationships hypothesized in model 11 are the correlations among the three latent commitment variables and the observed variables. NFI_b and $PNFI_b$ respectively represent the NFI and PNFI for model 11.⁸

⁸ By definition, $NFI_b = [(x^2)_{base} - (x^2)_{model}] / [(x^2)_{base} - df_{model}]$ and $PNFI_b = (df_{model} / df_{base}) \times NFI_{base}$.

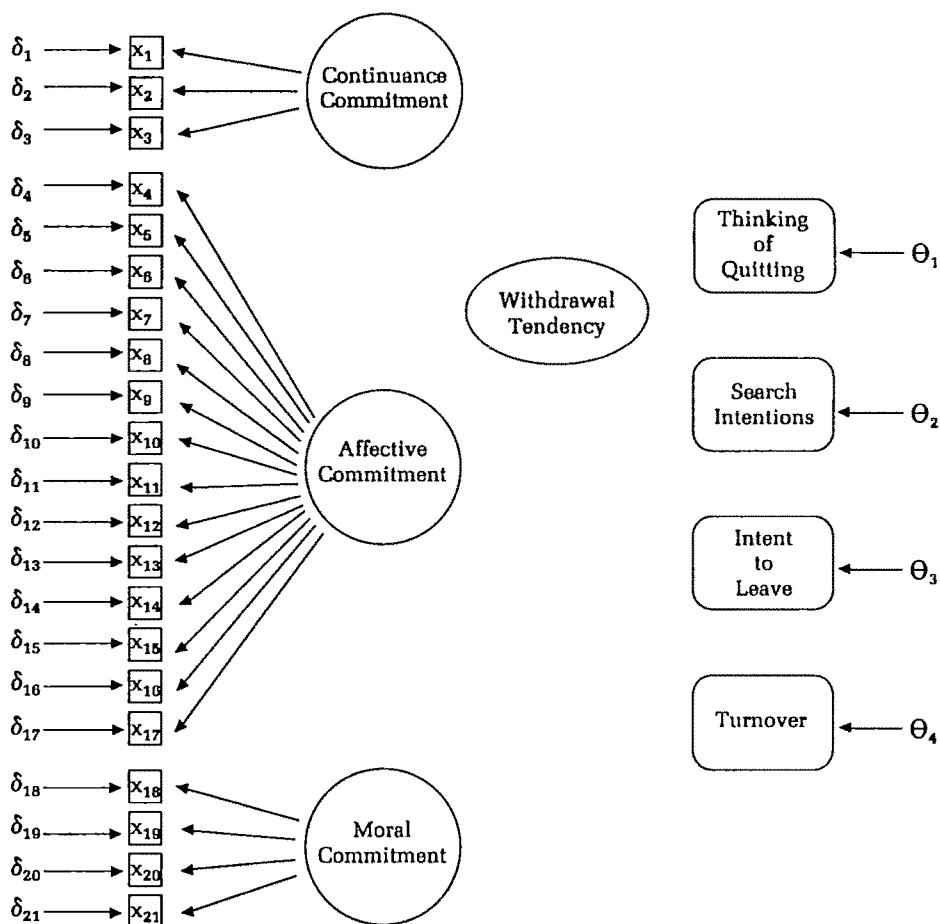
FIGURE 10
Model 10: Fully Saturated Latent Correlation Model^a



^a δ , ϵ , and Θ = error terms; β , γ , and λ = path coefficients.

In addition to these goodness-of-fit indexes, two statistics proposed by Browne and Cudeck (1989) were included: the root mean square error of approximation (RMSEA) and the expected cross-validation index (ECVI). The RMSEA is a measure used to test the null hypothesis of close fit, which is much more meaningful than the null hypothesis of perfect fit mentioned earlier. In addition to the test, a confidence interval for RMSEA can be constructed to gauge how well a model fits the data. Browne and Cudeck provided the following guidelines: an RMSEA lower than .05 indicates a "very good" fit; a value from .05 to .08 indicates a "fair to mediocre" fit; a value from .08 to .10 indicates a "poor" fit; and an RMSEA greater than .10 a "very bad" fit. They deemed the RMSEA to be superior to any of the

FIGURE 11
Model 11: Baseline Model^a



^a δ and Θ = error terms.

aforementioned goodness-of-fit indexes as a measure of model error. The ECVI, on the other hand, is a measure of overall model discrepancy across all possible calibration samples. In other words, it measures both model error and sampling error; the smaller the ECVI, the less the overall discrepancy.

RESULTS

Descriptive Statistics

Table 5 shows variable means, ranges, standard deviations, and alpha coefficients. The commitment scales demonstrated acceptable internal consistency, with the lowest reliability estimate being .77. On the average, continuance commitment values (4.11–7.00) were lower than affective commit-

ment values (4.68–7.00), and affective commitment values were lower than moral commitment values (5.25–7.00). Items that emphasized duty (5.84–7.00), dedication (5.43–7.00), and loyalty (5.26–7.00) had the highest average levels of agreement. Variation in the continuance commitment scale was nearly double that in the other commitment scales. As shown in Table 6, affective and moral commitment were fairly strongly correlated ($r = .56$), but continuance commitment was modestly related to moral commitment ($r = .27$) and weakly related to affective commitment ($r = .17$). All three commitment measures were moderately to strongly related to the withdrawal variables, but continuance commitment was the only commitment scale significantly correlated with turnover.

Factor Analysis

Table 7 summarizes results of the principal axes factor analysis of the 21 commitment variables. Three factors were extracted that accounted for 56

TABLE 5
Descriptive Statistics^a

Variables ^b	Means	s.d.	Minimum	Maximum	α
Continuance commitment	12.337	5.076	3.00	21.00	.77
x_1	4.489	2.022	1.00	7.00	
x_2	3.807	2.130	1.00	7.00	
x_3	4.041	1.993	1.00	7.00	
Affective commitment	65.541	14.383	23.00	98.00	.94
x_4	4.703	1.430	1.00	7.00	
x_5	4.647	1.033	1.00	7.00	
x_6	4.429	1.278	1.00	7.00	
x_7	4.880	1.446	1.00	7.00	
x_8	5.263	1.578	1.00	7.00	
x_9	4.682	1.469	1.00	7.00	
x_{10}	4.786	1.257	1.00	7.00	
x_{11}	4.541	1.474	1.00	7.00	
x_{12}	4.628	1.507	1.00	7.00	
x_{13}	4.714	1.371	1.00	7.00	
x_{14}	4.515	1.292	1.00	7.00	
x_{15}	4.214	1.121	1.00	7.00	
x_{16}	4.665	1.252	1.00	7.00	
x_{17}	4.895	1.469	1.00	7.00	
Moral commitment	21.007	5.063	6.00	28.00	.83
x_{18}	5.841	1.377	1.00	7.00	
x_{19}	5.141	1.690	1.00	7.00	
x_{20}	5.430	1.595	1.00	7.00	
x_{21}	4.596	1.560	1.00	7.00	
Thinking of quitting	2.193	1.013	1.00	5.00	
Search intentions	2.511	1.266	1.00	5.00	
Intent to leave	4.260	1.951	2.00	11.00	
Leave-stay	.177	.381	0.00	1.00	

^a N = 270.

^b Descriptions of the variable items appear in the Appendix.

TABLE 6
Bivariate Correlations^a

Variables	1	2	3	4	5	6	7
1. Moral commitment							
2. Continuance commitment	.27						
3. Affective commitment	.56	.17					
4. Thinking of quitting	-.39	-.35	-.58				
5. Search intentions	-.39	-.49	-.52	.68			
6. Intent to leave	-.45	-.52	-.55	.73	.73		
7. Leave-stay	-.11	-.19	-.10	.11	.18	.22	

^a Correlations above .15 are significant at $p < .05$.

percent of the total variance present in the 21 items. The table shows factor loadings for orthogonal and oblique rotations of the three factors. From the factor loadings that exceed .4 in absolute value, a clear pattern emerges: one factor is a linear combination of the 14 affective commitment variables, and the remaining two factors represent continuance commitment and moral commitment, respectively. This simple structure provides strong statistical support for the notion that continuance, affective, and moral commitment are latent variables in the structural equation models proposed.

LISREL Results

The results of the chi-square tests, shown in Table 8, reveal that all but two models, models 1 and 8, must be rejected (at $\alpha = .01$) as perfect fits. In addition, model 6 cannot be rejected as a close fit on the basis of the RMSEA test. All the other models fail the test of close fit (at $\alpha = .01$). These three models also provide a very good fit to the data on the basis of the other goodness-of-fit measures listed in Table 8.

First, consider the traditional theory model, model 1, shown in the first row. The RMSR, RMSEA, and ECVI statistics (.054, .024, and 1.60, respectively) indicate a very good fit, and all the other fit statistics either exceed or approximately equal .9. When any of these fit statistics is compared to its counterpart in the trimmed models (models 2–5), model 1 is superior. Therefore, there is no evidence to support the notion that the structure of the withdrawal process can be simplified by trimming one or more of the observed withdrawal variables from the causal relationships hypothesized by traditional theory.

How does model 1 compare to the two simpler, competing models, models 6 and 8? For each of the fit indexes reported in Table 8, the value for model 1 is always better than that for model 6, but not by much. The index value for model 8 always exceeds that of model 6 and almost always exceeds that of model 1. (The only exceptions are the PGFI, PNFI₀, and PNFI_b.) For the two "best" measures of fit, the RMSEA and ECVI, model 8 outperforms model 1, and model 1 outperforms model 6. Thus, according to statistical criteria, model 8 appears to be the best of the three models with very good

TABLE 7
Results of Principal Axes Factor Analysis^a

Dimensions	Variables ^b	Orthogonal Factor Loadings			Oblique Factor Loadings		
		Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3
Continuance commitment	x ₁	.059	.088	.853	-.001	.865	.021
	x ₂	.050	.212	.763	-.056	.758	-.141
	x ₃	.069	.044	.543	.040	.551	.037
Affective commitment	x ₄	.681	.366	.105	.641	.028	-.200
	x ₅	.826	.320	.154	.593	.087	-.157
	x ₆	.487	.263	.004	.462	-.052	-.152
	x ₇	.738	.290	.071	.739	-.000	-.095
	x ₈	.482	.227	-.002	.470	-.054	-.113
	x ₉	.646	.171	.031	.679	-.021	.011
	x ₁₀	.842	.211	.087	.888	.021	.034
	x ₁₁	.791	.267	.090	.807	.019	-.047
	x ₁₂	.896	.108	.016	.761	-.032	.100
	x ₁₃	.709	.210	.027	.737	-.034	-.015
Moral commitment	x ₁₄	.787	.165	.050	.843	-.008	.067
	x ₁₅	.726	.154	.125	.774	.073	.069
	x ₁₆	.806	.147	.158	.868	.104	.109
	x ₁₇	.781	.256	.029	.802	-.041	-.045
	x ₁₈	.169	.808	.090	-.041	.010	-.657
	x ₁₉	.285	.753	.117	.035	.014	-.789
	x ₂₀	.305	.744	.145	.061	.043	-.768
	x ₂₁	.313	.600	.122	.127	.036	-.596
Eigenvalue		8.958	1.753	1.071			
Percentage of variance explained		42.7	8.3	5.1			
Cumulative percentage		42.7	51.0	56.1			

^a Factor loadings greater than .400 in absolute value are in boldface.

^b Descriptions of the variable items appear in the Appendix.

fits, but not by much. However, when the criterion of parsimony is added to the statistical criteria, model 8 is superior.

A Detailed Analysis of Model 8

To summarize, we can reject neither the null hypothesis of perfect fit nor the null hypothesis of close fit for model 8. We would be remiss, however, if we only examined the overall fit of the model. Nonsensical results, such as parameter estimates with signs opposite what is expected or known, and outliers—a few unusually large residuals—can occur in conjunction with good overall fit measures (Bollen, 1989). When this result occurs, it may be a signal that a model is misspecified. Thus, an examination of the individual components of model 8 was essential to establish its utility.

Normalized residuals. To check for outliers, we examined the normalized residuals, which are corrected for sample size and scaling differences, for the 325 unique elements of the sample covariance matrix. Only nine

TABLE 8
LISREL Results

Model/Description	df	χ^2	RMSR	GFI	AGFI	PGFI	NFI ₀	PNFI ₀	NFI _b	PNFI _b	RNFI	RMSEA	ECVI
1 Traditional theory	270	312**	.054	.963	.955	.867	.996	.896	.979	.958	.994	.024†	1.80
2 Three withdrawal variables trimmed	273	1,868	.254	.777	.734	.707	.855	.778	.200	.198	-.185	.149	7.47
3 Thinking of quitting, search trimmed	272	1,878	.240	.776	.732	.704	.854	.774	.195	.192	-.193	.150	7.52
4 Search trimmed	271	1,436	.191	.828	.794	.748	.894	.807	.416	.408	.143	.128	5.85
5 Thinking of quitting trimmed	271	1,531	.186	.817	.781	.738	.885	.799	.368	.361	.071	.133	6.21
6 Spurious correlation	266	332	.056	.960	.952	.851	.994	.881	.967	.932	.976	.031†	1.72
8 Constrained latent correlation	269	304*	.051	.964	.956	.864	.997	.894	.982	.957	.999	.022†	1.57

† $p > .10$ * $p > .05$ ** $p > .01$

normalized residuals, less than 3 percent, exceeded three in absolute value, and most (about 70 percent) were less than one. The lack of a significant number of large residuals, or outliers, again suggests that model 8 adequately reproduces the observed covariance matrix.

Parameter estimates. Table 9 gives the parameters (path coefficients) of model 8, along with their respective weighted-least-squares estimates (unstandardized), standard errors, and *t*-statistics. Each of the estimates has the expected sign. For example, the latent commitment variables are positively related to the observed commitment variables and negatively related to the latent withdrawal tendency variable. Examination of the *t*'s suggest that all the parameters except one are significant. The lone insignificant path is the direct effect of the latent moral commitment variable on the latent withdrawal tendency variable.

Coefficients of determination. The last column in Table 9 reports the coefficient of determination, R^2 , for each equation in the model. For structural equations with latent variables, R^2 is not interpreted exactly as it is in regression analysis, where it is the multiple coefficient of determination. Here, the R^2 for an observed variable represents the proportion of the observed (sample) variance in the variable that the model can predict. For example, in the first row of Table 9, $(R^2)_{x_1} = .639$. This implies that about 64 percent of the variance in x_1 is accounted for by the latent continuance commitment variable, c_1 . Note that the individual R^2 s for the equations relating the observed variables to the latent variables (the measurement portion of the model) range from a low of .319 to a high of .828, with the majority (two-thirds) above .600. The overall coefficient of determination for the measurement portion of the model, reported in footnote a of Table 9, is .999. This high overall R^2 summarizes the joint effect of the latent variables on the observed variables and reconfirms our earlier findings: the observed variables are excellent indicators of the latent commitment variables. The R^2 values for the structural equations relating the latent commitment variables to the latent withdrawal tendency variable and relating withdrawal tendency to turnover are .679 and .076, respectively. Thus, the three latent commitment variables account for 68 percent of the variance in the tendency for an employee to withdraw from an employing organization, and the latent withdrawal tendency variable accounts for about 8 percent of the variance in the dichotomous variable stay-leave. The overall R^2 for the structural portion of the model, which measures the joint effect of the latent commitment variables on the withdrawal tendency variable, is approximately 68 percent. The overall fit measures, normalized residuals, individual parameter estimates, corresponding *t*-statistics, and the overall coefficients of determination all support model 8 as a reasonable representation of the causal structure underlying the employee withdrawal process.

Direct and indirect effects. In terms of the path coefficients of model 8, the indirect effects of the latent commitment variables, on organizational departure are $\gamma_1\beta_1$, $\gamma_2\beta_1$, and $\gamma_3\beta_1$, respectively; the direct effect of the latent withdrawal tendency variable on turnover is β_1 . We used the estimated path

TABLE 9
Analysis of the Path Coefficients of Model 8^a

Causal Relations ^b	Parameters	Weighted- Least-Squares Estimates	Standard Errors	t	R ²
Continuance commitment					
→X ₁	λ ₁	1 ^c			.639
→X ₂	λ ₂	1.110	.081	13.717	.787
→X ₃	λ ₃	0.748	.037	13.338	.358
Affective commitment					
→X ₄	λ ₄	1 ^c			.655
→X ₅	λ ₅	0.959	.029	32.788	.602
→X ₆	λ ₆	0.698	.030	23.067	.319
→X ₇	λ ₇	1.104	.029	35.084	.674
→X ₈	λ ₈	0.732	.031	23.793	.351
→X ₉	λ ₉	0.891	.030	29.579	.520
→X ₁₀	λ ₁₀	1.124	.029	38.558	.828
→X ₁₁	λ ₁₁	1.086	.029	37.680	.773
→X ₁₂	λ ₁₂	0.900	.030	29.770	.531
→X ₁₃	λ ₁₃	0.955	.030	31.894	.597
→X ₁₄	λ ₁₄	1.025	.029	35.317	.689
→X ₁₅	λ ₁₅	0.987	.030	33.169	.639
→X ₁₆	λ ₁₆	1.057	.029	36.410	.732
→X ₁₇	λ ₁₇	1.057	.029	36.379	.732
Moral commitment					
→X ₁₈	λ ₁₈	1 ^c			.453
→X ₁₉	λ ₁₉	1.195	.061	19.561	.647
→X ₂₀	λ ₂₀	1.289	.065	19.936	.753
→X ₂₁	λ ₂₁	1.083	.059	18.214	.531
Withdrawal tendency					
→Thinking of quitting	λ ₂₂	1 ^c			.777
→Search intentions	λ ₂₃	0.981	.035	28.172	.747
→Intent to leave	λ ₂₄	0.997	.037	27.320	.773
Continuance→Withdrawal	γ ₁	-0.538	.048	-11.283	
Affective→Withdrawal	γ ₂	-0.567	.047	-12.120	.679
Moral→Withdrawal	γ ₃	-0.078	.075	-1.041	
Withdrawal→Turnover	β ₁	0.312	.039	7.984	.076

^a The overall R² for the measurement portion of the model is .999; the overall R² for the structural portion of the model is .679.

^b Descriptions of the variable items appear in the Appendix.

^c Statistic represents a constrained constant.

coefficients to compute estimates of these total effects; Table 10 reports those estimates. Since turnover is coded 1 if the worker leaves and 0 if not, the expected value (or mean) of the variable represents the probability that the worker leaves the firm. Consequently, the total effect is the incremental amount we expected the probability of leaving to change for every one-unit increase in the scale of the latent variable.

We also computed estimates of the asymptotic standard errors of the effects using the multivariate delta method suggested by Folmer (1981) and

TABLE 10
Effects of Latent Variables on the Probability of Leaving

Latent Variables	Total Effects	Estimates	Standard Errors	Approximate 95 Percent Confidence Interval
Continuance commitment	$\gamma_1\beta_1$	-.168	.025	-.218, -.118
Affective commitment	$\gamma_2\beta_1$	-.177	.026	-.229, -.125
Moral commitment	$\gamma_3\beta_1$	-.024	.023	-.070, .022
Withdrawal tendency	β_1	.312	.039	.234, .390

Sobel (1982, 1986). For this recursive model, it can be shown that the asymptotic variance of the indirect effect of a latent commitment variable on turnover is $(\beta_1)^2\text{Var}(\gamma_i) + (\gamma_i)^2\text{Var}(\beta_1)$.⁹ Substituting the estimates and variances of the path coefficients from Table 9 into this expression and taking the square root, we obtained the asymptotic standard errors shown in Table 10. Since the latent withdrawal tendency variable has a direct effect on organizational departure, the standard error of this effect is simply the standard error of β_1 , given in Table 9.

On the basis of the asymptotic standard errors, approximate 95 percent confidence intervals for the effects of the latent variables on turnover were computed. These intervals, given in the last column of Table 10, are interpreted as follows: A one-point increase on the latent continuance commitment scale leads indirectly to a decrease in the probability of leaving the organization between .118 and .218; a one-point increase on the latent affective commitment scale leads indirectly to a decrease in the probability of leaving the organization between .125 and .229; a one-point increase on the latent moral commitment scale leads indirectly to a change in the probability of leaving the organization ranging from -.070 to .022; and a one-point increase on the latent withdrawal tendency scale leads directly to an increase in the probability of leaving the organization between .234 and .390. Notice that the 95 percent confidence interval for moral commitment includes zero, implying that the indirect effect of moral commitment on organizational departure is not significant. This result was expected since γ_3 , the path coefficient relating moral commitment to withdrawal tendency, is not significant.

DISCUSSION

For over two decades, researchers have persistently and gradually refined the meaning of organizational commitment. It has evolved into a complex concept that can serve as a summary index of work-related experiences and as a predictor of work behaviors and behavioral intentions (cf. Mathieu & Zajac, 1990). The purpose of this study was to expand understanding of the commitment-turnover relationship. This was accomplished by (1) clarifying

⁹ For details, see Bollen (1989).

the dimensionality of the commitment construct, (2) evaluating eight models that included alternative conceptualizations of the withdrawal process linking commitment and turnover, and (3) using statistical methods that enabled structural equation modeling with a dichotomous variable and that allowed highly sophisticated evaluations of alternative causal models.

Review of Findings

The pattern of organizational commitment levels revealed in these data is interesting. Statistical comparisons among the three forms of commitment measured indicated that employees in the firm studied had relatively high average levels of moral commitment, which was especially shown in response to items that emphasized a sense of duty and dedication to the firm. This pattern is understandable, given the organization's mission to supply aerospace products and services to the defense industry. Affective commitment was also relatively high, especially as shown by the item reflecting the loyalty theme. These levels contrast with the neutral response to the continuance commitment items. It appears that the strongest components of psychological attachment to this organization were symbolic and noninstrumental, not pragmatic (cf. Brown, 1969; Buchanan, 1974a; Hall et al., 1970). However, the extent of the variance in continuance commitment scores relative to affective and moral commitment scores suggests that this pattern of central tendencies may mask the presence of a cohort of strongly continuance-committed employees.

The most interesting bivariate correlational results were the weak relationships between the forms of commitment and the turnover measure. This pattern, coupled with the strong relationships between the forms of commitment and withdrawal variables and the moderate relationship between intent to leave and turnover, suggests that commitment affects turnover only indirectly, through withdrawal intentions. These results led us to expect to find evidence supporting indirect effects in the causal models.

Results from the factor analyses indicated that we were able to conceptualize and measure three distinct forms of organizational commitment. This finding provides further support for the classic idea that attitudinal commitment is multidimensional (Kanter, 1968). In addition, it supports the emerging contention that affective and moral commitment are indeed distinct concepts (Allen & Meyer, 1990; Randall et al., 1990). The only point of minor convergence between the two scales centered on the loyalty item, which had a mean and a standard deviation similar to those of the moral commitment items. Also, although the loyalty item loaded cleanly on the affective commitment factor in the primary data and in one set of validation data, it had equivalent cross-loadings between the affective and moral commitment factors in the second validation data set. Because most of the data we know about support loyalty as a component of affective commitment and because loyalty, according to the dictionary, is defined clearly as an affective state, we continue to construe this concept as integral to the development of af-

fective commitment. However, to employees, the everyday meaning of loyalty to an organization may imply psychological attachments that parallel some aspects of moral commitment. Further research is necessary to unravel this connection.

Contrary to Mathieu and Zajac's (1990) arguments, our view is that it is important to map the dimensionality of organizational commitment whether or not the specific dimensions differentially influence other variables of interest. At this stage, it seems researchers are consistently finding that single-factor models do not represent the conceptual and empirical domain of organizational commitment. Clearly, it would be unwise to dismiss these results in future predictive studies.

Comparison of Models

Causal modeling techniques enabled us to compare several formulations of the commitment-turnover relationship. Overall, the traditional theory model, model 1, a modification of Mobley and colleagues's (1978) work, provided a very good fit. Furthermore, model 1 could not be improved by simplification (models 2–5). When paths theorized as links between commitment and turnover were trimmed, the performance of the more parsimonious models was substantially weaker (Table 8). Given these data, it appears that the logical first step in theory development, trimming paths, cannot improve this field's premier model.

However, model 6, specified to represent the possibility that relationships among withdrawal variables are spurious because of their common dependence on the three forms of commitment, also provided a very good fit and in general performed nearly as well as the modified Mobley and colleagues' model. This finding suggests that, in previous research testing the traditional model without comparisons with a spurious model, the importance of causal paths among the three withdrawal variables may have been inflated. It is possible that researchers have interpreted correlations among the withdrawal variables as causal effects when they may have been statistical artifacts. As in this study, if correlations among the withdrawal variables can be reduced to zero or otherwise become practically meaningless when the effects of their antecedents, such as organizational commitment or job satisfaction, are controlled, there is evidence for spurious association. The theoretical implication of this finding is not that the withdrawal variables should be trimmed, since models 2–5 were found to be inferior to Mobley and colleagues' formulation. Nor do we favor a sweeping generalization concerning model 1 based on findings in one data set. Instead, it seems that further research is needed comparing Mobley and colleagues' model with others, such as models 6, 7, and 8, that specify reciprocal or nonrecursive paths among the withdrawal variables.

On this theme, results comparing Mobley and colleagues' model with model 8, which represents the withdrawal variables as indicators of an unmeasured latent factor, withdrawal tendency, are suggestive. This model

also provided a very good fit and actually outperformed both model 1 and model 6, adding more support to the idea that the modified Mobley and colleagues' model may be too complex and restrictive in its specification of relationships among the withdrawal variables. Consistent with Hom and Griffeth's (1991) findings, support for this model suggests that closer study of cognitive psychology may be beneficial in conceptualizing commitment-turnover processes. There are many avenues to follow in applying recent cognitive theory to the latent withdrawal cognition concept developed in this study. For example, there are parallels with work on mindlessness (Langer, 1978, 1990, 1993; Langer & Piper, 1987). Following this perspective, we might theorize that individuals typically exhibit vague, general orientations and tendencies toward a particular behavior rather than distinct, sequentially ordered, focused cognitions. Also, there are parallels with work on heuristic and automatic information-processing models (Bargh, 1989; Chaiken, Liberman, & Eagly, 1989; Feldman, 1981; Kihlstrom, 1987; Kirkpatrick & Epstein, 1992). From the perspective of Bargh's cognitive process theory, attitudinal changes can be seen as causing the development of general tendencies and evaluative states. These states may lead directly to behaviors or cause the emergence of specific attitudes and behavioral intentions designed to gather information about the efficacy of engaging in action. Finally, the extensive research on bias in social cognition is applicable if it is assumed that "there is little to distinguish social cognition from other forms of cognition" (Schneider, 1991: 531). Despite loss of important detail, people prefer to use categories that summarize large amounts of information. Thus, they may gloss over specific withdrawal cognitions and rely on a more basic category, such as a withdrawal tendency, when deciding about staying with an employing organization. Overall, model 8 corresponds most closely with recent advances in theorizing how the human mind works in everyday life. Although models 1 and 6 provided very good fits, we advance model 8 as most worthy of more detailed analysis for three reasons: (1) statistically, it has the best overall fit profile, (2) it is more consistent with recent cognitive theory than are the other models, and (3) it is the most parsimonious of the three best models (cf. Hom & Griffeth, 1991).

Overall, model 8 represented the data well: the normalized residuals were acceptable, the directionality of the parameter estimates was as expected; and, with one exception, the coefficient-of-determination values were high (Table 9). As in much behavioral research, attitudinal factors accounted for a small (only about 8 percent) but significant percentage of the variance in turnover. The three latent commitment variables accounted for about 68 percent of the variance in the withdrawal tendency variable. As expected, continuance and affective commitment had significant indirect effects on turnover (Table 10). On the average, a one-unit increase in the latent continuance commitment scale corresponded to a decrease in the probability of an individual's leaving the organization of between roughly 12 and 22 percent, and a one-unit increase in the latent affective commitment

scale corresponded to a decrease in the probability of leaving of between roughly 13 and 23 percent. It was not possible to improve prediction of the probability of leaving through changes in the latent moral commitment scale. This failure may seem surprising, since it is easy to imagine how situations that undermine or compromise moral identification could lead to an employee's thinking about quitting and other withdrawal dynamics. The finding may show that staying with an organization has much to do with feelings of belongingness, fondness, warmth and affection and with a desire to avoid the monetary or other costs associated with separation. We can speculate that withdrawal cognitions and quitting occur relatively spontaneously. They might correspond more closely to fluctuations in emotional states and personal estimates of sunk costs than to more stable, value-based, or even spiritual, identifications. Alternatively, it may be that the small variance in moral commitment in this data set produced range restriction effects, attenuating associations with the variable. The strongest effect on turnover was from the latent withdrawal tendency variable: a one-unit increase led directly to a 23–39 percent increase in the probability of an individual's leaving the organization.

Conclusions and Summary

Using the power of causal modeling techniques, we were able to select three models of the original eight specified for further consideration. Using a combination of statistical, theoretical, and philosophical (i.e., parsimony criterion) reasoning, we selected as superior a single model with a latent withdrawal tendency construct, model 8. Our main conclusion is that commitment-turnover researchers have relied too heavily on unidimensional concepts of commitment and sequential formulations of the withdrawal process variables. Despite the considerable gains in understanding that have resulted from these traditions, they should now be seen as leading to plausible but not compelling ways to think about commitment-turnover processes.

This study has some limitations. First, our data show that 48 of the 270 employees studied left the firm after 99 weeks. This turnover rate, about 9 percent per year, is quite low, and may have undermined prediction. A recent meta-analysis (Cohen, 1993) reported that the relationship found between commitment and turnover was stronger in studies in which the interval between the measurement of the two variables was less than six months. If we could have used a period shorter than two years to measure separations, stronger effects of attitudes may have been detectable. This outcome may somewhat limit the generalizability of the findings, but the results are probably conservative estimates of the impact of attitudinal factors on turnover. It also could be that the forms of commitment differ in stability over time. If so, the optimal time interval for data collection may depend on the type of commitment being studied. Recording the exact date

of separation for each employee studied could account for such differences.¹⁰

Second, we acknowledge that, apart from the turnover measure, a single set of cross-sectional data was used to estimate causal paths. Common method variance problems may have inflated correlations among the commitment and withdrawal cognition variables.

Third, although we specified and estimated models that were carefully justified, it is likely that improvements could be made by adding variables. For example, reviewers for this journal suggested that control variables such as age and tenure needed to be specified. Given existing research and the assumption that the measures of organizational commitment reflect age, tenure, and other correlates (cf. Mathieu & Zajac, 1990; Mowday et al., 1982), we did not include control variables in the models.¹¹ In general, it must be conceded that the models estimated in this study could be both expanded and refined in further testing, but we contend that they are reasonable approximations of the state of the art in commitment-turnover research.

Fourth, although we were not able to estimate model 7, specifying reciprocal paths among the withdrawal cognitions, because of identification problems, that model is similar to model 8 in that it also has a solid connection with recent theorizing about social cognition. The phenomenon of ruminative thought is worth pursuing further in relation to employee turnover. More elaborate models incorporating other antecedents of quitting an

¹⁰ In fact, we were able to measure the exact date of separation for each employee and coded a "days stayed" variable that had a hypothetical range of between 1, representing a respondent who separated the day after the study began, and 688, for a respondent who did not separate. We tried to experiment with this variable by using it as a measure of turnover in lieu of the dichotomous measure, but because it was severely skewed (222 cases had a value of 688), we could not do meaningful analyses.

¹¹ In two recent meta-analyses, Cohen (1991, 1993) reported that the relationship between commitment and turnover may vary with employee age. Therefore, we reanalyzed model 2, which includes direct effects between commitment and turnover, specifying age as a moderating variable and performing a multigroup LISREL analysis. Two age groups, corresponding to early and middle-later career stages, were considered: age less than or equal to 35 years ($N = 129$) and age over 35 ($N = 136$). The analysis revealed that the path coefficients between the three types of commitment and turnover were not statistically different for the two age groups. Thus, in this study, age does not moderate the commitment-turnover relationship. However, the failure to find differences between age groups could be the result of insufficient test power, since both groups contained fewer than 200 individuals (Bollen, 1989).

Also, as stated in the text, organizational tenure has traditionally been considered as an antecedent of commitment (Mathieu & Zajac, 1990). However, recent research (cf. Cohen, 1993) suggests that tenure has a direct effect on turnover, independent of commitment. To test this proposition, we reanalyzed model 8, our best model, including tenure and specifying a direct path between tenure and turnover. Although the path coefficient between the two variables was found to be of borderline significance ($t = -2.98$), none of the fit statistics for model 8 changed significantly. In addition, the magnitude and direction of the path coefficients were unchanged. In fact, the RMSEA for model 8 with tenure added was slightly larger (.023) than the RMSEA for the original model (.022). Therefore, the inclusion of tenure did not change the substantive interpretation of model 8.

organization, as well as reciprocal paths among withdrawal cognitions, would allow proper identification and could be estimated in future research.

In summary, this study makes some useful contributions to theorizing about the commitment-turnover relationship. First, empirical substantiation of three separate forms of commitment highlights the need for future research using continuance, affective, and moral concepts of organizational commitment. Also, since we found that the types of commitment differed in their impacts on the turnover process, future research could determine the reasons behind these differences. Second, specification of the latent withdrawal tendencies variable within the commitment-turnover model proved to be important. The model with this variable, model 8, was at least as effective as the traditional model and, as we have argued, reasonably could be construed as superior. Future research should examine more closely the usefulness of latent withdrawal variables, comparing them to more precise, sequentially ordered cognitive constructs. Finally, it seems clear that commitment-turnover research can benefit from advanced causal modeling techniques that permit comparison of competing models. With the development of PRELIS, which enables appropriate estimation of models with dichotomous variables and more sophisticated measures of overall fit, such as the PNFI, NFI_b, PNFI_b, RNFI, RMSEA, and ECVI, there is little reason for researchers to rely on logistic regression or discriminant analysis (cf. Huselid & Day, 1991).

Causal inference in the organizational sciences remains problematical. Even in a relatively well-developed area, such as commitment-turnover research, causal analysis is illuminating only when alternate, theoretically plausible models are estimated and compared.

REFERENCES

- Ajzen, I., & Fishbein, M. 1980. *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.
- Allen, N., & Meyer, J. 1990. The measurement and antecedents of affective, continuance, and normative commitment. *Journal of Occupational Psychology*, 63: 1-18.
- Angle, H. L., & Perry, J. L. 1983. Organizational commitment: Individual and organizational influences. *Work and Occupations*, 10: 123-146.
- Aranya, N., & Jacobson, D. 1975. An empirical study of the theories of organizational and occupational commitment. *Journal of Social Psychology*, 97: 15-22.
- Bargh, J. A. 1989. Conditional automaticity: Varieties of automatic influence in social perception and cognition. In J. S. Uleman & J. A. Bargh (Eds.), *Unintended thought*: 3-51. New York: Guilford Press.
- Bateman, T., & Strasser, S. 1984. A longitudinal analysis of the antecedents of organizational commitment. *Academy of Management Journal*, 27: 95-112.
- Becker, H. S. 1960. Notes on the concept of commitment. *American Journal of Sociology*, 66: 32-40.
- Bentler, P. M., & Bonett, D. G. 1980. Significance tests and goodness-of-fit in the analysis of covariance structures. *Psychological Bulletin*, 88: 588-600.

- Bluedorn, A. 1982. A unified model of turnover from organizations. *Human Relations*, 35: 135-153.
- Bollen, K. A. 1989. *Structural equations with latent variables*. New York: Wiley.
- Bollen, K. 1992. Personal communication. October 25, 1992.
- Brown, M. E. 1969. Identification and some conditions of organizational involvement. *Administrative Science Quarterly*, 14: 346-355.
- Browne, M., & Cudeck, R. 1989. Single sample cross-validation indices for covariance structures. *Multivariate Behavioral Research*, 24: 445-455.
- Buchanan, B. 1974a. Building organizational commitment: The socialization of managers in work organizations. *Administrative Science Quarterly*, 19: 533-546.
- Buchanan, B. 1974b. Government managers, business executives, and organizational commitment. *Public Administration Review*, 34: 339-347.
- Chaiken, S., Liberman, A., & Eagly, A. H. 1989. Heuristic and systematic information processing within and beyond the persuasion context. In J. S. Uleman & J. A. Bargh (Eds.), *Unintended thought*: 212-252. New York: Guilford Press.
- Cohen, A. 1991. Career stage as a moderator of the relationship between organizational commitment and its outcomes: A meta-analysis. *Journal of Occupational Psychology*, 63: 253-268.
- Cohen, A. 1993. Organizational commitment and turnover: A meta-analysis. *Academy of Management Journal*, 36: 1140-1157.
- Cotton, J., & Tuttle, J. 1986. Employee turnover: A meta-analysis and review with implications for research. *Academy of Management Review*, 11: 55-70.
- DeCotiis, T. A., & Summers, T. P. 1987. A path analysis of a model of the antecedents and consequences of organizational commitment. *Human Relations*, 40: 445-470.
- Etzioni, A. 1975. *A comparative analysis of complex organizations* (2d ed.). New York: Free Press.
- Farkas, A., & Tetrick, L. 1989. A three-wave longitudinal analysis of the causal ordering of satisfaction and commitment on turnover decisions. *Journal of Applied Psychology*, 74: 855-868.
- Farrell, D., & Rusbult, C. E. 1981. Exchange variables as predictors of job satisfaction, job commitment, and turnover: The impact of rewards, costs, alternatives, and investments. *Organizational Behavior and Human Performance*, 28: 78-95.
- Feldman, J. 1981. Beyond attribution theory: Cognitive processes in performance appraisal. *Journal of Applied Psychology*, 66: 127-148.
- Ferris, K. R., & Aranya, N. 1983. A comparison of two organizational commitment scales. *Personnel Psychology*, 36: 87-98.
- Folmer, H. 1981. Measurement of the effects of regional policy instruments by means of linear structural equation models. *Environment and Planning*, 13: 1435-1448.
- Griffin, R., & Bateman, T. 1986. Job satisfaction and organizational commitment. In C. Cooper & I. Robertson (Eds.), *International review of industrial and organizational psychology*: 157-188. Chichester, England: Wiley.
- Gould, S. 1979. An equity-exchange model of organizational involvement. *Academy of Management Review*, 4: 53-62.
- Gould, S., & Penley, L. 1982. *Organizational commitment: A test of a model*. Working paper series, University of Texas at San Antonio.

- Hall, D., Schneider, B., & Nygren, H. 1970. Personal factors in organizational identity. *Administrative Science Quarterly*, 15: 176-189.
- Hertzog, C. 1990. On the utility of structural equation models in development research. In P. B. Baltes, D. L. Featherman, & R. M. Lerner (Eds.), *Lifespan development and behavior*: 257-285. Hillsdale, NJ: Erlbaum.
- Hom, P., & Griffeth, R. 1991. Structural equations modeling test of a turnover theory: Cross-sectional and longitudinal analyses. *Journal of Applied Psychology*, 76: 350-366.
- Hom, P., Griffeth, R., & Sellaro, L. 1984. The validity of Mobley's (1977) model of turnover. *Organizational Behavior and Human Performance*, 34: 141-174.
- House, R., & Rizzo, J. 1972. Toward the measurement of organizational practices: Scale development and validation. *Journal of Applied Psychology*, 56: 388-396.
- Hrebiniak, L., & Alutto, J. 1972. Personal and role-related factors in the development of organizational commitment. *Administrative Science Quarterly*, 17: 555-572.
- Huselid, M., & Day, N. 1991. Organizational commitment, job involvement, and turnover: A substantive and methodological analysis. *Journal of Applied Psychology*, 76: 380-391.
- James, L., Mulaik, S., & Brett, J. 1982. *Causal analysis: Models, assumptions and data*. Beverly Hills: Sage.
- Jermier, J. M., & Berkes, L. 1979. Leader behavior in a police command bureaucracy. *Administrative Science Quarterly*, 24: 1-23.
- Jermier, J. M., & Gaines, J. 1989. *Development of a new measure of affective commitment to the employing organization*. Working paper, University of South Florida, Tampa.
- Jöreskog, K., & Sörbom, D. 1988. *LISREL 7*. Chicago: SPSS.
- Kanter, R. 1968. A study of commitment mechanisms in utopian societies. *American Sociological Review*, 33: 499-517.
- Kidron, A. 1978. Work values and organizational commitment. *Academy of Management Journal*, 21: 239-247.
- Kihlstrom, J. F. 1987. The cognitive unconscious. *Science*, 237: 1445-1452.
- Kirkpatrick, L., & Epstein, S. 1992. Cognitive-experiential self theory and subjective probability: Further evidence for two conceptual systems. *Journal of Personality and Social Psychology*, 63: 534-544.
- Kline, C., & Peters, L. 1991. Behavioral commitment and tenure of new employees: A replication and extension. *Academy of Management Journal*, 34: 194-205.
- Koch, J., & Steers, R. 1978. Job satisfaction and turnover among public employees. *Journal of Vocational Behavior*, 12: 119-128.
- Langer, E. 1978. Rethinking the role of thought in social interaction. In J. H. Harvey, W. Ickes, & R. F. Kidd (Eds.), *New directions in attribution theory*, vol. 2: 35-58. Hillsdale, NJ: Erlbaum.
- Langer, E. 1990. Minding matters. In L. Berkowitz (Ed.), *Advances in experimental social psychology*: 23-36. New York: Academic Press.
- Langer, E. 1993. *The illusion of calculated decisions*. Working paper, Harvard University, Cambridge, MA.
- Langer, E., & Piper, A. 1987. The prevention of mindlessness. *Journal of Personality and Social Psychology*, 53: 280-287.
- Lee, S. 1971. An empirical analysis of organizational identification. *Academy of Management Journal*, 14: 213-226.

- Lee, T., & Mowday, R. 1987. Voluntarily leaving an organization: An empirical investigation of Steer's and Mowday's model of turnover. *Academy of Management Journal*, 30: 721-743.
- Lerner, J., Hertzog, C., Hooker, K., Hassibi, M., & Thomas, A. 1988. A longitudinal study of negative emotional states and adjustment from early childhood through adolescence. *Child Development*, 59: 356-366.
- MacCallum, R., Wegener, D., Uchino, B., & Fabrigar, L. 1993. The problem of equivalent models in applications of covariance structure analysis. *Psychological Bulletin*, in press.
- March, J., & Simon, H. 1958. *Organizations*. New York: Wiley.
- Markus, H., & Zajonc, R. B. 1985. The cognitive perspective in social psychology. In G. Lindzey & E. Aronson (Eds.), *Handbook of social psychology* (3d ed.) vol. 1: 137-230. New York: Random House.
- Martin, L., & Tesser, A. 1989. Toward a motivational and structural theory of ruminative thought. In J. S. Uleman and J. A. Bargh (Eds.), *Unintended thought*: 306-326. New York: Guilford Press.
- Mathieu, J., & Zajac, D. 1990. A review and meta-analysis of the antecedents, correlates, and consequences of organizational commitment. *Psychological Bulletin*, 108: 171-194.
- Mayer, R., & Schoorman, F. 1992. Predicting participation and production outcomes through a two-dimensional model of organizational commitment. *Academy of Management Journal*, 35: 671-684.
- McGee, G., & Ford, R. 1987. Two or more dimensions of organizational commitment: Reexamination of the affective and continuance commitment scales. *Journal of Applied Psychology*, 59: 87-89.
- Meyer, J., & Allen, N. 1984. Testing the side-bet theory of organizational commitment: Some methodological considerations. *Journal of Applied Psychology*, 69: 372-378.
- Meyer, J., Allen, N., & Gellatly, I. 1990. Affective and continuance commitment to the organization: Evaluation of measures and analysis of concurrent and time-lagged relations. *Journal of Applied Psychology*, 75: 710-720.
- Michaels, C., & Spector, P. 1982. Causes of employee turnover. *Journal of Applied Psychology*, 67: 53-59.
- Miller, H., Katerberg, R., & Hulin, C. 1979. Evaluation of the Mobley, Horner, and Hollingsworth model of employee turnover. *Journal of Applied Psychology*, 64: 509-517.
- Mobley, W. 1977. Intermediate linkages in the relationship between job satisfaction and employee turnover. *Journal of Applied Psychology*, 62: 237-240.
- Mobley, W., Horner, S., & Hollingsworth, A. 1978. An evaluation of the precursors of hospital employee turnover. *Journal of Applied Psychology*, 63: 408-414.
- Morris, J. H., & Sherman, J. D. 1981. Generalizability of an organizational commitment model. *Academy of Management Journal*, 24: 512-526.
- Mottaz, C. 1989. An analysis of the relationship between attitudinal commitment and behavioral commitment. *Sociological Quarterly*, 30: 143-158.
- Mowday, R. T., Koberg, C. S., & McArthur, A. W. 1984. The psychology of the withdrawal process: A cross-validation test of Mobley's intermediate linkages model of turnover in two samples. *Academy of Management Journal*, 27: 79-94.
- Mowday, R., Porter, L., & Steers, R. 1982. *Employee-organization linkages*. New York: Academic Press.
- Mueller, C., Wallace, J., & Price, J. 1992. Employee commitment: Resolving some issues. *Work and Occupations*, 19: 211-236.

- Mulaik, S. A., James, L. R., Van Alstine, J., Bennett, N., Lind, S., & Stilwell, C. D. 1989. Evaluation of goodness-of-fit indices for structural equation models. *Psychological Bulletin*, 105: 430–445.
- O'Reilly, C. A., III, & Chatman, J. 1986. Organizational commitment and psychological attachment: The effects of compliance, identification, and internalization on prosocial behavior. *Journal of Applied Psychology*, 71: 492–499.
- O'Reilly, C. A., III, Chatman, J., & Caldwell, D. 1991. People and organizational culture: A profile comparison approach to assessing person-organization fit. *Academy of Management Journal*, 34: 487–516.
- Penley, L., & Gould, S. 1988. Etzioni's model of organizational involvement: A perspective for understanding commitment to organizations. *Journal of Organizational Behavior*, 9: 43–59.
- Porter, L., Crampon, W., & Smith, F. 1976. Organizational commitment and managerial turnover: A longitudinal study. *Organizational Behavior and Human Performance*, 15: 87–98.
- Porter, L., Steers, R., Mowday, R., & Boulian, P. 1974. Organizational commitment, job satisfaction, and turnover among psychiatric technicians. *Journal of Applied Psychology*, 59: 603–609.
- Randall, D. M., Fedor, D. B., & Longnecker, C. O. 1990. The behavioral expression of organizational commitment. *Journal of Vocational Behavior*, 36: 210–224.
- Reichers, A. 1985. A review and reconceptualization of organizational commitment. *Academy of Management Review*, 10: 465–476.
- Ritzer, G., & Trice, H. M. 1969. An empirical study of Howard Becker's side-bet theory. *Social Forces*, 47: 475–479.
- Salancik, G. 1977. Commitment and the control of organizational behavior and belief. In B. Staw & G. Salancik (Eds.), *New directions in organizational behavior*: 1–54. Chicago: St. Clair.
- Schneider, D. J. 1991. Social cognition. In M. R. Rosenzweig & L. W. Porter (Eds.), *Annual review of psychology*, vol. 42: 527–561. Palo Alto, CA: Annual Reviews.
- Sheldon, M. E. 1971. Investments and involvements as mechanisms producing commitment to the organization. *Administrative Science Quarterly*, 16: 143–150.
- Sherman, S. J., Judd, C. M., & Park, B. 1989. Social cognition. In M. R. Rosenzweig & L. W. Porter (Eds.), *Annual review of psychology*, vol. 40: 281–326. Palo Alto, CA: Annual Reviews.
- Sobel, M. 1982. Asymptotic confidence intervals for indirect effects in structural equation models. In S. Leinhardt (Ed.), *Sociological methodology 1982*: 290–312. San Francisco: Jossey-Bass.
- Sobel, M. 1986. Some new results on indirect effects and their standard errors in covariance structure models. In N. B. Tuma (Ed.), *Sociological methodology 1986*: 159–186. Washington DC: American Sociological Association.
- Sobel, M., & Bohrnstedt, G. W. 1985. Use of null models in evaluating the fit of covariance structure models. In N. B. Tuma (Ed.), *Sociological methodology 1985*: 152–178. San Francisco: Jossey-Bass.
- Spencer, D., Steers, R., & Mowday, R. 1983. An empirical test of the inclusion of job search linkages into Mobley's turnover decision process model. *Journal of Occupational Psychology*, 56: 137–144.
- Steers, R. M. 1977. Antecedents and outcomes of organizational commitment. *Administrative Science Quarterly*, 22: 46–56.

- Stevens, J. M., Beyer, J., & Trice, H. M. 1978. Assessing personal, role and organizational predictors of managerial commitment. *Academy of Management Journal*, 21: 380-396.
- Werbel, J., & Gould, S. 1984. A comparison of the relationship of commitment to turnover in recent hires and tenured employees. *Journal of Applied Psychology*, 69: 687-690.
- Wiener, Y. 1982. Commitment in organizations: A normative view. *Academy of Management Review*, 7: 418-428.
- Wiener, Y., & Vardi, Y. 1980. Relationships between job, organization, and career commitments and work outcomes: An integrative approach. *Organizational Behavior and Human Performance*, 26: 81-96.
- Williams, L., & Hazer, J. 1986. Antecedents and consequences of satisfaction and commitment in turnover models: A reanalysis using latent variable structural equation methods. *Journal of Applied Psychology*, 71: 219-231.

APPENDIX

Descriptions of Commitment Scales

Continuance Commitment*

- (x₁) It would be very hard for me to leave my organization right now, even if I wanted to.
- (x₂) I have too much invested in this company to leave it.
- (x₃) It would not be too costly for me to leave my organization in the near future. (R)

Affective Commitment

"Most people have specific feelings about their employing organization. When you think of your employing organization, what feelings do you experience? Please choose the number which best represents your feelings and enter it to the right of each question."

The 14 bipolar adjective items (referred to as x₄-x₁₇ in text) were presented in the following format:

Cold 1 2 3 4 5 6 7 Warmth ____

The other anchor pairs were:

Hate-love,
 Affection-contempt, (R)
 Detachment-belonging,
 Loyalty-disloyalty, (R)
 Boredom-excitement,
 Sadness-happiness,
 Disgust-fondness,
 Comfort-discomfort, (R)
 Lifelessness-spiritedness,
 Anger-peace,
 Ecstasy-agony, (R)
 Pleasure-pain, (R)
 Despair-hope.

* Meyer and Allen (1984) wrote items x₁ and x₃; we wrote item x₂.

Moral Commitment

- (x₁₈) I feel it is my duty to support this organization.
- (x₁₉) While I am in public, I think of myself as a member of this organization.
- (x₂₀) I am dedicated to this organization.
- (x₂₁) I get upset when people say negative things about this organization.

Stephen J. Jaros is a doctoral candidate in the Department of Management, College of Business, University of South Florida. His current research interests focus on the nature of power in organizations and on the concept and consequences of organizational commitment.

John M. Jermier is a professor of organizational behavior in the College of Business, University of South Florida. He received his Ph.D. degree in organizational behavior from Ohio State University. Much of his work has been focused on the development of a critical science of organizations, with a particular interest in research philosophy and methodology.

Jerry W. Koehler is an associate professor of management in the College of Business, University of South Florida. He received his doctorate in communication from Pennsylvania State University. He is currently on leave, serving as the deputy secretary of Labor and Employment Security for the state of Florida.

Terry Sincich is an assistant professor in the Information Systems/Decision Sciences Department, College of Business, University of South Florida. He received his Ph.D. degree in statistics from the University of Florida. His research interests include structural equation modeling and time-series forecasting applications.

ORGANIZATIONAL DEMOGRAPHY IN JAPANESE FIRMS: GROUP HETEROGENEITY, INDIVIDUAL DISSIMILARITY, AND TOP MANAGEMENT TEAM TURNOVER

MARGARETHE F. WIERSEMA
University of California, Irvine

ALLAN BIRD
New York University

This study demonstrates how demography theory can be extended to non-U.S. settings by developing a comprehensive model of factors that vary across nations and that may moderate the link between demographic characteristics and organizational outcomes. We propose that constraints on variation as well as sociocultural and organizational processes moderate the attention people pay to individual differences, thereby influencing demographic effects. In examining the effects of the composition of top management teams in Japanese firms, we found that heterogeneity on age, team tenure, and the prestige of the university attended were significant correlates of team turnover. Moreover, these findings were substantially stronger than those of comparable studies in the United States, suggesting that factors associated with changes in ethnological context mediate demographic effects.

Demography theory has generated considerable interest because of its theoretical importance in the study of organizations (Stinchcombe, McDill, & Walker, 1968). Organizational demography reflects similarity and dissimilarity among individuals, making it a meaningful perspective for understanding processes affected by group dynamics, such as the level and extent of within-group communication, as well as outcomes of group dynamics, including such phenomena as the level of consensus within a group, innovation, and turnover. Demography theory's focus on how compositional characteristics influence interpersonal dynamics within a group of individuals makes it particularly relevant to understanding outcomes involving the top management teams of organizations (Pfeffer, 1983). Recent research has highlighted the importance of top management team demographic composition on a variety of phenomena, including executive turnover (Jackson, Brett, Sessa, Cooper, Julin, & Peyronnin, 1991; Wagner, Pfeffer, & O'Reilly,

We would like to thank this journal's reviewers for their helpful comments on earlier drafts of this article. We gratefully acknowledge the research support provided by the University of California, Irvine Academic Senate Committee on Research and the Fulbright Foundation.

1984), strategic change (Wiersema & Bantel, 1992), and organizational effectiveness (Michel & Hambrick, 1992; Murray, 1989).

A distinguishing characteristic of empirical investigations into organizational demographics is that they have, without exception, been conducted on U.S. organizations, thus reflecting characteristics, both demographic and social, of the underlying U.S. population. Recent critiques of organizational theory (Boyacigiller & Adler, 1991; Hofstede, 1980; Roberts & Boyacigiller, 1984) have pointed to the importance of avoiding an assumption of universality in theories developed and tested within a single country, noting that such theories may suffer from cultural blindspots and unrecognized assumptions. In their recommendations for internationalizing organizational theories developed in the United States, Boyacigiller and Adler (1991) suggested the use of non-U.S. settings to frame the theoretical approach in order to bring to the surface underlying assumptions.

The influence of demographic effects may vary across nations as population and sociocultural patterns vary. This variation may be especially relevant to the use of demography theory to compare U.S. and Japanese top management teams. Besides obvious differences in population attributes, differences in management practices and organizational characteristics and processes may further affect the link between group demography and organizational outcomes such as team turnover.

To gain insight into extending the utilization of demography theory to non-U.S. settings, we developed a comprehensive model of factors that vary across nations and that may moderate the link between demographic characteristics and organizational outcomes. Considering these principal influences on Japanese organizations led to the idea that demographic effects would be stronger in Japan than in the United States. We empirically examined demographic effects by focusing on the relationship between top management team attributes and team turnover.

DEMOGRAPHY THEORY APPLIED TO JAPANESE ORGANIZATIONS

The basic model underpinning demography theory is that demographic characteristics influence social dynamics, which influence organizational outcomes. According to Pfeffer (1983), demographic variables have an important causal influence on intervening processes that in turn affect a variety of organizational outcomes. Group demographic attributes provide surrogate measures for the common experiences and backgrounds that shape language development and influence the quality and frequency of communication (Allen & Cohen, 1969; March & Simon, 1958; Pelz & Andrews, 1966; Rogers & Shoemaker, 1971). According to Jackson and colleagues (1991), group demographic composition is a strong determinant of interpersonal attraction and sets the social context for relationships within an organization. The degree of an individual's similarity or dissimilarity to others in a work group may influence processes that affect employee job satisfaction and organizational commitment, important predictors of turnover (Michaels & Spector,

1982; Mobley, Griffeth, Hand, & Meglino, 1979). Demographic similarity has been found to promote a cohort effect, fostering group solidarity and cohesion, leading to greater integration and higher levels of interpersonal communication (Back, 1951; Lott & Lott, 1961). These demographic compositional effects on the level of communication and consensus have been linked to group and organizational outcomes, such as employee turnover (McCain, O'Reilly, & Pfeffer, 1983; O'Reilly, Caldwell, & Barnett, 1989; Wagner, Pfeffer, & O'Reilly, 1984).

The ability of demography to capture underlying group processes provides a key to understanding organizational outcomes. However, ethnological factors that influence the degree of interpersonal attraction and the attention paid to individual differences within organizations may indirectly influence demographic composition and individual similarity. By focusing theoretical and empirical efforts exclusively on U.S. organizations, researchers have neglected to consider contextual factors that may influence the traditional demography model.

A more comprehensive examination of demography theory should take into account the influence of the ethnological context within which individuals are embedded. Differences in population attributes, sociocultural values, management practices, and organizational processes may affect the link between demography and organizational outcomes, as shown in Figure 1. Underlying population and structural characteristics may constrain differences in the possible range of demographic variation within the group under study. Sociocultural values and organizational processes also influence employees. These factors moderate demographic effects through their influence over group members' attention to differences.

Constraints on Variation

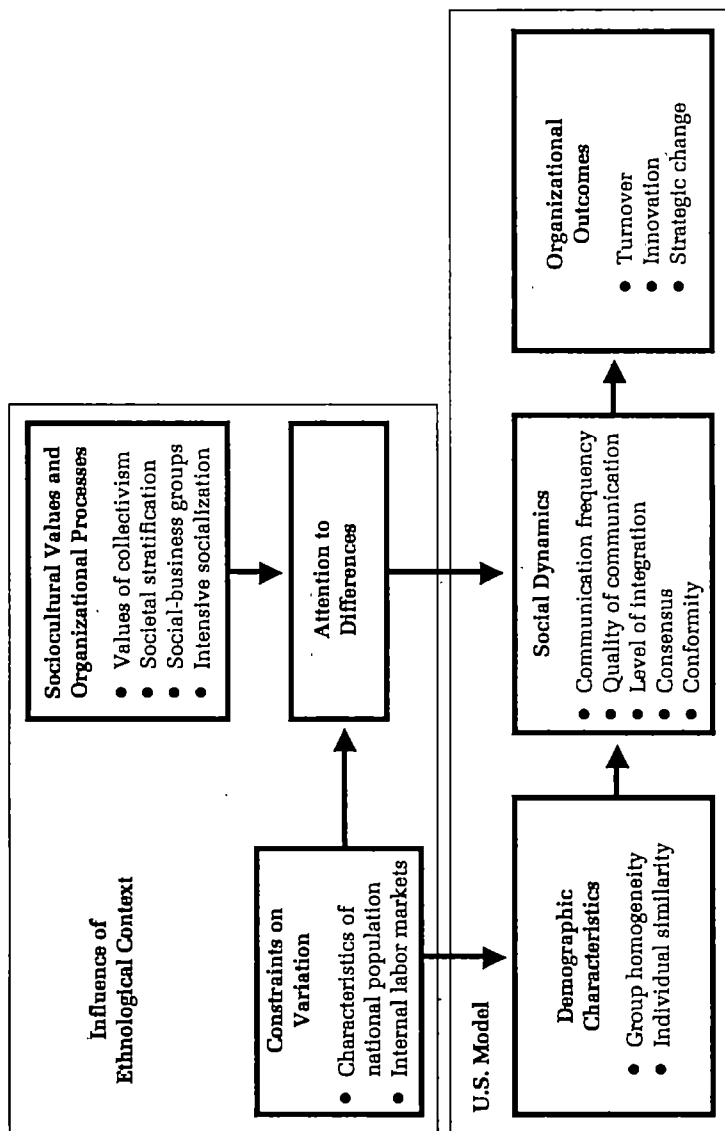
Members of a work group are not selected from an unlimited pool of candidates. The degree of heterogeneity in an organization and in the larger population from which organization members are drawn restricts the degree of heterogeneity possible within a group.

The homogeneity of Japan's population is well documented (Ozaki, 1979; Reischauer & Craig, 1978), as is its insularity (Benedict, 1946; Clark, 1979; Nakane, 1971). Until relatively recent times, Japan was a geographically isolated nation. With the exception of the forced immigration of large numbers of Korean workers in the early 20th century, there has been no influx of immigrants. Japan is unusual among industrialized countries for having no large minorities or an immigrant work force at either the blue- or white-collar level.

Clark (1979) argued that the isolation and homogeneity of Japanese society have led, in part, to high degrees of insularity and particularism.¹ As

¹ Particularism refers to the exclusive adherence to or interest in one's own society, in this case, the Japanese society.

FIGURE 1
The Influence of Ethnological Factors on Organizational Demography



have several others (Bellah, Madsen, Sullivan, Swidler, & Tipton, 1985; Benedict, 1946; Ozaki, 1979; Singer, 1983), he noted that one consequence of this insularity has been an inclination to make sharp distinctions between insiders and outsiders.

Constraints on variation also derive from organizational systems that restrict the flow of individuals into and out of an organization. Pfeffer (1983) noted that demographic attributes may affect employee flows. The reciprocal seems equally likely. Employment systems can constrain the variation possible in work groups. The overwhelming body of evidence (Abegglen, 1956; Clark, 1979; Cole, 1971, 1979; Dore, 1973; Kagono, Nonaka, Sakakibara, & Okumura, 1985; Lincoln & Kalleberg, 1990; Rohlen, 1973) indicates a strong preference among Japanese firms, across industries, for internal labor market employment systems. In such a system, a firm recruits new members only for entry-level positions and fills all other positions through promotions. The system encourages organizational homogeneity, first because outsider influence is limited to low-level positions and second, because career grooming and organizational socialization lead to greater conformity among employees as their organizational tenure increases. The net effect of internal labor market prevalence is to indirectly restrict organizational exit as well: in the absence of good employment prospects elsewhere, employees have strong incentives to remain (Cole, 1979).

Constraints on variation due to population characteristics and the use of internal labor markets moderate demographic effects by influencing group members' attention to attribute differences. Blau (1977) argued that the effects of organizational demography may vary across countries because a community's general level of homogeneity affects how noticeable similarity and dissimilarity will be within it. General heterogeneity makes differences less blaring and therefore tempers the similarity-dissimilarity effect. The general population characteristics and reliance on internal labor markets within Japanese organizations promote homogeneity, which makes individual differences rare and therefore more conspicuous (Blau, 1977).

Sociocultural Values and Organizational Processes

Organizational processes affected by demographic influences may be driven by differing values, norms, and expectations. Sociocultural values and organizational processes influence perceptions of what is similar and what is different (Bond & Forgas, 1984) and what is relevant and what is not (Hofstede, 1980).

The cultural value of collectivism, a value associated with Japanese culture (Bellah et al., 1985; Hofstede, 1980), is a likely moderator of attention to differences. Collectivism is the belief that collectivist, or group, concerns, rather than individualistic ones, should motivate the members of a society. According to Hofstede (1980), collectivist cultures value the emotional dependence of individuals on institutions and organizations. Prior research suggests that collectivism is an important distinguishing element of cultural variability (Gudykunst & Ting-Toomey, 1988).

Triandis (1986) suggested that members of collectivistic cultures are likely to make clearer distinctions between in-group and out-group members. Under collectivist norms, predilections for group affiliation may encourage members to overlook or downplay differences between themselves and fellow members in favor of making sharp distinctions between members and nonmembers (Nakane, 1971). The focus on shared group beliefs and the value attached to group affiliation and cooperation in a collectivist society may also encourage individual members to tolerate higher levels of personal discomfort or alienation than their counterparts in more individualistic cultures, a conclusion numerous comparative studies on employee satisfaction and mobility have borne out (Cole, 1979; Lincoln, Hanada, & Olson, 1981; Lincoln & Kalleberg, 1990).

At the same time, groups in collectivist societies are likely to strongly encourage conformity. One consequence of that practice may be greater sensitivity to differences that an outsider might consider trivial. For example, Kidder (1992) noted that Japanese high school students were extremely sensitive to differences in classmates who had lived outside of Japan for any period of time. Minor variations in hair and skin color due to exposure to the sun were sufficient grounds for *ijime* (hazing). Slight differences in gait or in clothing style were also points of fixation. In order to avoid harassment and ostracism, returnees found it necessary to exhibit features and engage in behaviors not simply similar, but nearly identical, to those of their classmates.

Societal stratification is another distinguishing feature of Japanese culture that may influence perceptions of individual differences. Despite the apparent presence of a large middle class—over 95 percent of the population perceive themselves as members of that group (Christopher, 1982)—class stratification remains strong in Japan. Ties to the imperial family and to formerly noble or “old-money” families distinguish the elite from the nonelite (van Wolferen, 1989). The widespread practice of conducting pre-nuptial and preemployment family background checks reflects concern with social class (Reischauer & Craig, 1978). Sharp distinctions between substrata within a class also occur, with small variations in material wealth or status reflecting acute differences in social position (Clark, 1979).

Societal stratification, with its implicit hierarchical, rigid structures based on status, is also reflected in Japanese organizations. Studies on social class related to business executives (Aonuma, 1965; Mannari, 1974; Taira & Wada, 1987) have found a sharp distinction between elite and nonelite managers. Taira and Wada documented the presence of a ruling elite and provided evidence of strong ties spanning corporate, social, and governmental boundaries. Moreover, the cited studies have indicated that as a social class, the Japanese elite is a more homogeneous group than the nonelite. In countries with social stratification, individuals will be further inclined to strongly affiliate with members of their own status group and to distinguish other individuals along this hierarchical criterion. The perceived distinction between elite and nonelite will further serve to magnify attention to differ-

ences among individuals. As a result, the existence of an implicit class structure serves to increase awareness of differences.

Japanese organizations mirror Japanese society in terms of stratification. Though appearing to have a large middle-management class—the so-called salarymen—Japanese organizations also exhibit elaborate rank and position structures, with stratification within ranks (Clark, 1979; Yoshino, 1968).

In addition to societal stratification, the presence within Japanese society and organizations of powerful social or business cliques may also heighten awareness of differences. There are myriad exclusive associations and cliques in which membership is based on family, school, or business ties (van Wolferen, 1989). *Habatsu*, influential coalitions predicated on common attributes, such as the length of tenure in a firm or the university attended, are common in most large organizations (Bird, 1990; Clark, 1979; Yoshino, 1968). In Japanese organizations, group membership is an important underlying influence on whom an individual socializes with and does business with. It is not unusual to base business relations on common group affiliation. New relationships are initiated through personal introductions, and problems with existing ones are resolved through personal intervention. In this context, it is “know-who” that gets things done (Kagono, 1992), “know-who” being a function of the groups and factions to which an individual belongs. The presence of such groups in and of itself draws attention to the importance of differences and suggests that the effects of dissimilarity will be heightened. In addition, business cliques further accentuate hierarchical differentiation in Japanese business society, which further amplifies awareness of individual differences.

Personnel practices that promote intensive organizational socialization also characterize Japanese firms. Employees enter firms in cohorts, joining them after college graduation in entry-level positions. The main hiring effort generally occurs once a year, with all new employees receiving the same new-entrant socialization. Japanese organizations process their newly hired employees through intensive socialization programs designed to instill a common culture and a common set of values (Hatvany & Pucik, 1981; Kagono et al., 1985; Ouchi, 1981). The intent is to differentiate employees from nonemployees by training the former to think and act the company way. Employees are thus instilled with organizational history, values, philosophies, and expectations. When socialization is combined with limited possibilities for organizational entry, the result is less variety in perspectives and strongly shared organizational values and language. These forces are likely to magnify differences that do exist, even though they are small. The result at the organizational level is likely to be similar to that of collectivism at the sociocultural level: strong pressures for conformity and great sensitivity among individuals to dissimilarities.

Sociocultural values and organizational processes moderate demographic effects by influencing group members' attention to attribute differences. Demographic attributes can be viewed as signals that others use as a form of shorthand in making evaluative decisions (Spence, 1975). Under

demography theory, the key evaluative decision concerns attraction and affiliation: individuals feel comfortable with and are attracted to those who are like themselves and uncomfortable with and unattracted to those who are different; hence, they look for signals of similarity, with similar demographic characteristics being one obvious and easily identifiable variety. However, sociocultural factors may heavily influence decisions as to which signals to attend to or how much attention to give a specific signal (Hofstede, 1980).

To summarize, there is less demographic variation in Japanese than in U.S. organizations. However, because of sociocultural values and organizational processes specific to Japanese organizations, variation is actually noticed and acted upon more in Japanese than in U.S. organizations. As a result, the ethnological context of Japanese organizations has consequences for the application of demography theory. The heightened attention to differences we expected among individuals in Japanese organizations is likely to enhance demography's influence on group dynamics despite reduced heterogeneity. This proposition can be examined in light of one of the most commonly studied group and organizational outcomes, turnover.

ORGANIZATIONAL DETERMINANTS OF JAPANESE TOP MANAGEMENT TEAM TURNOVER

Turnover in a top management team is a significant strategic event for an organization. Work in the United States has revealed that executive succession can lead to fundamental changes in the strategic activities of a firm (Hambrick & Mason, 1984) and have an important symbolic impact (Pfeffer, 1981).

In the United States, researchers have focused on the interpersonal group context that may influence a group's long-term membership (see Figure 1). The degree of homogeneity within the group along demographic characteristics may underscore important interpersonal dynamics, such as communication frequency and quality, level of integration, and group consensus and conformity (Katz, 1982; Pelz & Andrews, 1966; Rogers & Shoemaker, 1971). Researchers in the United States have found that high demographic similarity is associated with group cohesion (Back, 1951; Shaw & Shaw, 1962) and high levels of interpersonal communication (Kiesler & Kiesler, 1969). Conversely, heterogeneity within a group can diminish communication among members and their integration into the group. These events increase individual isolation, which in turn leads to turnover (Jackson et al., 1991; McCain et al., 1983; O'Reilly et al., 1989; Wagner et al., 1984).

Demographic heterogeneity within a top management team may also evince structural discontinuities that present opportunities for political influence—occasions when the workings of the organization are out of balance or are susceptible to manipulation. For example, "lumpiness" in the age composition of a company's management may create opportunities for

one age cohort to gain influence over others. As members of an especially large age cohort reach positions of authority within an internal labor market, they are collectively able to control more resources than are other age cohorts and may award disproportionate amounts to other members of their own cohort. When an organization's distribution is smooth, both younger and older cohorts can neutralize such manipulations.

Four demographic characteristics of top management team members—age, organizational tenure, team tenure, and the prestige of the university attended—were included in this study because evidence suggests they are variables likely to have an important causal influence on intervening processes of social dynamics (Pfeffer, 1983), which may in turn affect the level of turnover (Jackson et al., 1991; McCain et al., 1983; O'Reilly et al., 1980; Wagner et al., 1984). In addition, the ethnological context of Japan heightens the attention to differences in these specific demographic attributes because of the sociocultural values and organizational processes and constraints on variation that affect Japanese organizations.

Age

Age is an important demographic attribute because it influences a person's background and personal experiences outside the employing organization (Ryder, 1965). These experiences influence attitudes and beliefs that contribute to the creation of a shared language among the members of age cohorts (Rhodes, 1983). By contrast, age dissimilarity can result in major differences in beliefs and value systems (Wagner et al., 1984), which in turn can affect the level of integration and cohesion within a group. As a result, executives who are dissimilar to other team members in age are more likely to leave a firm than executives who are similar to other team members.

In Japanese organizations, age is used to promote cohort effects both formally and informally (Hatvany & Pucik, 1981; Rohlen, 1973; Yoshino, 1968). The practice of hiring new graduates once a year and their intensive organizational socialization reinforce the development of organizational age cohorts (Hatvany & Pucik, 1981; Rohlen, 1973). The functioning of the typical internal labor market, in which initial promotions are put off for seven to eight years and then awarded en masse on the basis of age (Sekimoto & Hanada, 1985, 1986), further encourages the development of age cohorts.

At the top management team level, the effects of the internal labor market are reflected in "exit-driven" appointment practices (Bird, 1988). In the absence of significant corporate growth, promotion to the upper echelon of the organization can only occur when those already at the top leave. Similarly, positions can only be maintained by removing those who wait below. In this context of competition for a constrained resource—continued membership in the top management team—attention to age-related differences will be heightened.

Hypothesis 1: Age heterogeneity will be positively associated with turnover in Japanese top management teams.

Organizational Tenure

Long tenure is an indicator of experience in an organization and familiarity with a shared language, which is likely to influence top management team processes that may in turn affect the level of team turnover. A shared language reflects similarities in how individuals interpret, understand, and respond to information; it results in part from similar backgrounds and experiences gained from tenure within an organization (Allen & Cohen, 1969). In Japanese organizations, long-tenured executives have been exposed to a variety of jobs. In addition, past firm decision making and experiences are shared and understood among those with similar tenures. Organizational tenure thus provides a frame of reference within which managers operate. Homogeneity on organizational tenure can lead to a common vocabulary (Rhodes, 1983), a similar interpretation of events (Allen & Cohen, 1969; Lawrence & Lorsch, 1967), and enhanced communication among group members (March & Simon, 1958; Zenger & Lawrence, 1989). With frequent and accurate communication among top team members, the similarity of their beliefs about and perceptions of the organization increases. Such group communication patterns become stable and routinized over time (Katz, 1982; Roberts & O'Reilly, 1979), resulting in high levels of group cohesion and integration (Ebadi & Utterback, 1984; O'Reilly et al., 1989).

By contrast, heterogeneity on organizational tenure suggests that top team members will differ in their sets of experiences within an organization and will bring varied cognitive perspectives to issues. Communication difficulty will be high (McCain et al., 1983), and conflict and power struggles will be based on dissimilar attitudes, values, and beliefs (Pfeffer, 1983). Individuals' lack of integration and socialization into a group will lead to feelings of isolation, lack of organizational attachments, and turnover (Roberts & O'Reilly, 1979). As a result, executives who are dissimilar to other team members on organizational tenure are more likely to leave a firm than executives who are similar to other team members.

The intensive socialization characteristic of Japanese organizations further reinforces the shared frame of reference within which managers operate. Rohlen (1973) and Clark (1979) provided detailed qualitative accounts of how the socialization processes pervading Japanese firms generate pressure for conformity and increase cohesion. Ouchi (1981) characterized Japanese organizations as clans, arguing that conformance to shared norms is one organizational consequence of their structure.

Although Japanese executives who reach the top management team level have spent an average 28 years in their organizations, not all senior executives follow this path (Bird, 1988). Amakudari ("descent from heaven") appointees can enter a company's managerial ranks by transferring laterally from the government or other firms. As a result of their relatively short tenures within the organization, these individuals lack the shared language and experiences that more tenured managers have. When amakudari

or other individuals hired in mid-career are promoted to the top management team, they may be viewed as intruders who don't belong. The introduction of mid-career appointees from outside a firm will serve to heighten attention differences related to organizational tenure.

Hypothesis 2: Heterogeneity on organizational tenure will be positively associated with turnover in Japanese top management teams.

Top Management Team Tenure

Top management team tenure reflects the average length of time managers have worked together as a team or group. Demography researchers have found that group tenure similarity is likely to affect the nature and extent of communication within the group (Zenger & Lawrence, 1989). Times of entry into the group are likely to influence its interaction patterns (Pfeffer, 1983). Specifically, group tenure similarity is likely to heighten integration and cohesion. Group cohesiveness indicates the degree to which members are motivated to remain in the group (Shaw, 1976). Group dynamics resulting from tenure similarity have been shown to be related to lower levels of turnover (O'Reilly et al., 1989). Executives who are dissimilar to other team members on team tenure should thus be more likely to leave the firm than executives who are similar to other team members.

To rise to the top, Japanese managers build support networks (Bird, 1990). Some relationships extend beyond the employing organization to influential stakeholders and include ties to important others at government ministries and agencies, a firm's main bank, and other firms within its industrial group. One outcome of this process of building relationship networks is that a manager becomes aligned with a particular coalition or faction. As they rise within the organization, managers maintain their power base by helping others of their faction as well.

Because Japanese CEOs possess substantial power to make personnel decisions concerning the top management team (Mills, 1978), it is likely that they will consolidate their position by keeping close associates on the team. The ability to appoint as well as maintain their associates as top team members will lead to the existence of a dominant coalition at the top of an organization. The success with which the CEO and a dominant coalition exert influence over the selection of top team members will constrain the variability in team tenure within the group. The more dominant the coalition, the greater the likelihood that its members will occupy top management team slots, heightening tenure similarity. Conversely, a weak coalition will be less able to resist influence from other factions that want to place their members on the top management team. Furthermore, executives whose length of tenure on the team is dissimilar to that of other executives are more likely to exit, since they are likely to be less strongly connected to the team's dominant coalition.

Hypothesis 3: Heterogeneity on team tenure will be positively associated with turnover in Japanese top management teams.

University Prestige

Large Japanese organizations limit most recruitment of new college graduates to specific universities (Inohara, 1990). The large retail company, Mitsukoshi, for example, hires about 60 percent of its college graduates from just two of the top six or seven private institutions, Keio and Waseda universities. The prestige of the university an individual attends is a strong indicator of social class in Japanese society (Obunsha, 1987) and among managers (Aonuma, 1965; Mannari, 1974). Though entrance to universities is predicated on an individual's performance on entrance exams rather than on socioeconomic background, it has a powerful effect on class membership following graduation (Taira & Wada, 1987).

Clark (1979) pointed out that a hierarchical ranking of Japanese universities in terms of prestige influences interfirm and intrafirm relations, shaping patterns of association, affiliation, and group formation. The prestige of the university an individual attended is likely to influence not only the organization joined but also the career trajectory within the organization (Inohara, 1990). For Mitsukoshi, for example, 80 percent of the members of the board of directors are graduates of Keio University, the most prestigious private university in Japan. The use of university prestige as a determinant of promotions reinforces notions of elite and nonelite membership (Spence, 1975). Within firms, influential factions develop based on sharing an alma mater (Yoshino, 1968). University cliques support their members, with senior employees serving as mentors for juniors.

Individuals who attend universities with similar levels of prestige feel comfortable with each other because they share experiences and attributes of status. High homogeneity in university prestige should reinforce group cohesiveness and integration. Because of the attention paid in Japanese society to class differences and the strength of social-business cliques in Japanese organizations, university prestige is an important demographic attribute that distinguishes individuals in an organization. As a result, heterogeneity on university prestige may be an important predictor of top management team turnover. Dissimilarity to other team members in university prestige can be a strong indicator of an individual's not belonging to the cadre comprising the top management team, and such an individual will be more likely to leave the organization.

Viewing the prestige of the university attended as an indicator of social class is not unique to Japan. The French have their cadre and noncadre managers, with cadre membership predicated on graduation from one of the *grande ecoles*. U.S. studies have also looked at social class as indicated by university prestige (D'Aveni, 1989; Jackson et al., 1991). Jackson and colleagues found that similarity in alma mater affected turnover in the elite subgroups of top management teams.

Hypothesis 4: Heterogeneity in the prestige of the university attended will be positively associated with turnover in Japanese top management teams.

METHODS

Firms

This study examined the link between top management team demographic attributes and turnover with data on 220 executives from 40 firms listed on the Tokyo Stock Exchange. We selected firms from four industries: banking, consumer electronics manufacturing, food processing, and large retail sales. For each industry, we collected data on the ten largest competitors. The size and scope of the firms in three of the four industries dropped dramatically beyond this point. The firms identified for each industry represented over 85 percent of the market share within the industry. We excluded the remaining firms in each industry because they were much smaller and regionally focused. Firms were classified by industry according to their four-digit section listings on the Tokyo Stock Exchange; diversified firms were classified by their largest business activity.

The problems associated with gaining access to company and executive information in Japan led to a research design that had an in-depth focus on just four industries. We chose two industries in each economic sector, food processing and consumer electronics in manufacturing and large retail sales and banking in service, because they were evaluated as differing substantially from each other along these dimensions: the age and size of member firms and the maturity and environmental turbulence of the industrial sector. We expected the power of the theoretical framework to increase substantially if the predicted relationships between top management team demographic attributes and turnover were observed within diverse industrial sectors and businesses.

Measures

Top management team. The main body of senior managers within a Japanese firm is the *torishimariyakukai*, or formal board of directors (Commercial Code of Japan, 1983). Within the *torishimariyakukai*, and serving as the key strategy-formulating and decision-making body, is the *jomukai*, or executive committee. Typically, executive committees are composed of a chief executive officer (CEO) and four to six senior officers, usually of managing director rank or higher. Such groups closely correspond to groups of top senior executives in U.S. firms. In most large Japanese companies, executive committees meet once a week or more often.

The 220 executives studied constitute all the *jomukai* members of the 40 selected firms in 1980. The average firm's *jomukai* consisted of 5.6 members. *Jomukai* members are appointed through a vote at a general meeting of the shareholders for a period of not more than two years, but their appointments can be renewed at the end of each period. The firm's CEO decides whether

or not to renew an appointment (Mills, 1978; Shiotsugu, 1986). Though the commercial code requires that directors be nominated by the board and elected by the shareholders, the reality is that the CEO announces who will be appointed at board meetings, and the shareholders rubber-stamp that selection (Mills, 1978). In larger organizations, CEOs may consult one or two confidants on the executive committee prior to deciding appointments, but the sole discretionary power still resides with the CEO (Bird, 1988; Mills, 1978).

Japanese CEOs do operate under several constraints. Bird (1990) identified four forces that mitigate and shape their decisions, particularly with regard to board appointments: (1) company norms and traditions, (2) former senior executives of a firm, (3) peers—CEOs in related industries—and (4) rival coalitions and interest groups within a firm.

There is no legal mandatory retirement age for Japanese directors as there is for regular company employees. Most Japanese companies set their white-collar retirement age between 55 and 60, with the average across firms currently 58 (Kono, 1984). Though directors may continue to serve on a board as long as their appointments are renewed, company norms and informal policies generally call for executive retirement at age 65, with exceptions made for CEOs and other senior executives case by case (Kono, 1984; Shimizu, 1980).

The lack of an official retirement age renders the distinction between turnover and retirement ambiguous in Japanese companies. Turnover occurs when a director's appointment is not renewed. Even for executives over 65 years of age, failure to be reappointed does not necessarily signal compliance with informal retirement policies; it may just as well reflect a forced exit or an individual decision to leave.

Top management turnover was examined at both the individual and organizational levels. The dependent variable was the incidence of turnover for the period, 1980 to 1983. At the individual level, turnover is a dichotomous variable, coded 0 if no turnover occurred, and 1 if turnover occurred. Turnover under age 65 represents a second measure of turnover for individuals less than 65 years of age in 1983. Use of the two measures allowed us to examine both age-related retirement and other turnover events, as has recent research (Puffer & Weintrop, 1991).

At the organizational level, turnover represents the proportion of the top management team in 1980 that were no longer with the organization in 1983. Turnovers under age 65 represents the proportion of the top management team in 1980 that were no longer with the organization in 1983 and were less than 65 years of age in 1983.

Top management team demography. Measures of demographic attributes were collected for all 220 managers studied using 1980 data on age, organizational tenure, executive committee tenure, and university prestige from the *Kaisha shokuin roku* [Registry of Company Executives] (1986). University prestige was determined by classifying universities into one of ten ranks based on rates of acceptance as listed in the *Zenroku daigaku shin*

gokaku kinyo rankingu: *Gakubuhēn* [Nationwide Rankings of Universities Based on Acceptance Rates] (1987). We computed demographic trait measures by aggregating all individuals within a top management team and taking the mean.

Heterogeneity of a top management team was calculated with the coefficient of variation, a measure of dispersion for interval-scaled data that is calculated by dividing the standard deviation by the mean for a group.

At the individual level, a distance measure, or measure of isolation, was used to capture the degree of membership in a cohort (Wagner et al., 1984). An individual's distance score directly reflects the absolute distance of that person from every other individual in a group.

Control Variables

Age. The demographic trait of age may also influence the level of top team turnover. As individuals get older, the likelihood that they will leave organizations increases. Accordingly, older top management teams should experience more turnover than younger ones. U.S. studies have empirically supported the positive association between team age and turnover (e.g., Jackson et al., 1991; Wagner et al., 1984).

Organizational performance. Evidence from succession research in the United States indicates that poor organizational performance leads to increased turnover (Allen, Panian, & Lotz, 1979; Eitzen & Yetman, 1972; Gamson & Scotch, 1964). When an organization's performance is below expectations, the financial markets exert pressures for corrective action. Poor organizational performance thus appears to be an important driving force for executive turnover.

In Japan, however, the link between performance and top team turnover is likely to be reversed. Kagono and colleagues (1985) found that Japanese firms are more likely to make proactive incremental changes than are U.S. firms. When a firm is doing well, executives are inclined to introduce frequent changes because the organization is running smoothly and can easily accommodate them. However, if a firm begins to do poorly, the inclination is to avoid making changes. Particularly in the case of changes at the top, custom dictates that during periods of difficulty executives remain at the helm until affairs have been righted (*Nikkei sangyo shinbun*, 1987).

Financial performance was measured as the ratio between average return on equity (ROE) for 1980 to 1983 and average industry ROE for that period; the *Japan Company Handbook* (1984) provided data.

RESULTS

Organization-Level Analysis

Table 1 presents the means, standard deviations, and correlations among the variables.

The hypotheses were tested for two models, as shown in Table 2. In model 1, we examined all turnovers within the top team, regardless of age.

TABLE 1
Descriptive Statistics and Correlations, Organizational Level^a

Variables	Means	s.d.	1	2	3	4	5	6	7	8
1. All turnovers	0.64	0.22								
2. Turnovers under age 65	0.37	0.27	.55***							
3. Mean team age	61.52	3.93	-.54***	-.74***						
4. Organizational performance	1.00	0.21	-.02	-.02	.38**					
5. Age heterogeneity	0.09	0.05	.14	.48**	-.36**	.07				
6. Organizational tenure heterogeneity	0.32	0.23	.29†	.42**	-.59***	-.25	.21			
7. Team tenure heterogeneity	0.97	0.34	-.05	.41**	-.22	.01	.25	.20		
8. University prestige heterogeneity	0.23	0.21	.49**	.33*	-.09	.15	-.22	.09	-.21	

^a N = 40.

† p < .10

* p < .05

** p < .01

*** p < .001

In model 2, we examined team turnover controlled for retirement by eliminating all turnover events for individuals who were 65 years of age or older in 1983. Both sets of analyses were considered important; the first enabled comparisons to prior studies that predominantly did not control for the effects of retirement on turnover. We conducted stepwise regression analyses to allow examination of the incremental effects of the demographic heterogeneity variables on team turnover.

In model 1, the control variables explain a significant amount of variance in team turnover (adjusted $R^2 = .29$). Organizational performance was not significantly related to team turnover. The beta coefficient for mean team age was highly significant and negative, contrary to expectations. The results thus indicate that higher mean team age was associated with lower turnover.

To test the hypotheses predicting a relation between demographic heterogeneity and turnover, we regressed the proportion of top team turnover on mean team age and organizational performance, entered first, and then the four indexes of heterogeneity, entered last. The heterogeneity variables explained a significant proportion of the variance in team turnover ($\Delta R^2 = .12$). The individual beta coefficient was only significant for university prestige heterogeneity, supporting Hypothesis 4. Results did not support Hypotheses 1, 2, and 3. The total model explained 41 percent of the variance in team turnover.

For model 2, in which turnover is controlled for by age, the control variables explained a significant amount of variance in team turnover (adjusted $R^2 = .62$). The beta coefficient for mean team age was highly significant and negative, indicating that higher mean team age was associated with lower turnover. Organizational performance was not significantly related to team turnover.

The addition of the heterogeneity variables led to a significant increase in explained variance ($\Delta R^2 = .16$). The beta coefficients were positive and significant for heterogeneity on age, team tenure, and university prestige, supporting Hypotheses 1, 3, and 4. Heterogeneity on organizational tenure was not a significant predictor of turnover, thus not providing support for Hypothesis 2. The results indicate that with normal retirements controlled, management team turnover is significantly associated with demographic heterogeneity.

A comparison of model 1 with model 2 indicated that mean team age as well as the heterogeneity variables explained significantly greater variance for team turnover when the dependent measure is controlled for by age.

We conducted an additional analysis to examine the effect of organizational size on top team turnover. Including size, measured as the logarithm of firm sales, in the analyses did not affect results ($t = .58$).

In a further analysis of the effect of industry membership, we incorporated three dummy variables for industry into the regression equations. Table 3 shows results.

Finally, the explanatory power of the heterogeneity variables increased significantly when we removed CEO turnover from our analysis ($\Delta R^2 = .19$).

TABLE 2
Results of Regression Analyses, Organizational Level^a

Step	Variables	Model 1: All Turnovers		Model 2: Turnovers Under Age 65	
		β	ΔR^2	β	ΔR^2
1	Control		.29***		.62***
	Mean team age	-.58**		-.66***	
	Organizational performance	.12		.14	
2	Heterogeneity		.12**		.16***
	Age	.05		.23**	
	Organizational tenure	-.05		-.08	
	Team tenure	-.09		.30***	
	University prestige	.41**		.38***	

^a N = 40.

* p < .05

** p < .01

*** p < .001

TABLE 3
**Results of Regression Analysis with Industry Added,
Organizational Level^a**

Variables	Turnovers Under Age 65	ΔR^2
Control		.65***
Mean team age	-.67***	
Organizational performance	.14	
Food processing	.05	
Consumer electronics	.04	
Retail sales	.11	
Heterogeneity		.11**
Age	.20†	
Organizational tenure	-.11	
Team tenure	.29**	
University prestige	.34**	

^a N = 40.

† p < .10

** p < .01

*** p < .001

Individual-Level Analysis

Table 4 presents the means, standard deviations, and correlations among the individual-level variables.

Logistic regression analyses were conducted for two models: all turnovers and turnovers under age 65. Table 5 shows the results. In the results of the analysis of model 1, the significant variables predicting the likelihood of turnover are age and distance on team tenure and university prestige. The model is significant, as indicated by the chi-square statistic (32.41). Model 2

TABLE 4
Descriptive Statistics and Correlations, Individual Level^a

Variables	Means	s.d.	1	2	3	4	5	6	7	8
1. All turnovers	0.63	0.48								
2. Turnovers under age 65	0.40	0.49	.62***							
3. Age	61.30	6.35	-.27***	-.68***						
4. Organizational performance	0.98	0.17	.03	-.04	-.15*					
5. Distance on age	6.40	3.46	.08	.09	.02	-.10				
6. Distance on organizational tenure	10.42	6.99	.00	.05	.03	.22***	.29***			
7. Distance on team tenure	7.39	4.72	.12†	.00	.18**	-.07	.22***	.11		
8. Distance on university prestige	1.89	1.33	.15*	.09	.02	-.24***	-.12†	.13*	.16*	

^a N = 220.

† p < .10

* p < .05

** p < .01

*** p < .001

TABLE 5
Results of Logistic Regression Analyses, Individual Level^a

Variables	Model 1: All Turnovers		Model 2: Turnovers Under Age 65	
	<i>b</i>	s.e.	<i>b</i>	s.e.
Age	-0.12**	0.03	-0.52**	0.08
Organizational performance	0.08	0.99	1.18	1.36
Distance on age	0.08	0.05	-0.05	0.10
Distance on organizational tenure	-0.02	0.02	0.04	0.04
Distance on team tenure	0.08†	0.04	0.03	0.05
Distance on university prestige	0.29*	0.13	0.38*	0.18
Constant	6.41**	1.78	28.62**	4.52
Logarithmic likelihood	-129.23		-72.69	
χ^2	32.41**		154.62**	
Pseudo R^2	.11		.52	

^a N = 220.

† $p < .10$

* $p < .05$

** $p < .01$

results indicate that age and distance on university prestige are again significant predictors of turnover when the dependent measure is controlled for by age. Model 2 is also highly significant ($\chi^2 = 154.62$). It appears that an individual's age and distance from others on a Japanese top management team in terms of university prestige are important influences on whether or not that individual leaves the organization.

DISCUSSION

Our central argument is that ethnological context can powerfully influence demographic effects in organizations. Specifically, we theorized that population characteristics and the use of internal labor markets in Japan constrain variation in Japanese organizations. Sociocultural values and organizational processes specific to Japanese organizations heighten the attention employees pay to even slight differences among people. As a result, ethnological context may moderate the strength of demographic effects on organizational outcomes. Examining turnover in Japanese top management teams as an example, we found that demographic influences were indeed significant predictors of team turnover. In this study's results, demographic effects account for more of the variance in top team turnover than they have in studies of top management team turnover in the United States (Jackson et al., 1991; Wagner et al., 1984; Wiersema & Bantel, 1993). The elaborated model presented here provides a theoretical rationale for identifying the ways in which demographic effects may vary when applied to a new ethnological context.

One major reason the effects of demographic characteristics may differ in U.S. and Japanese organizations may be the existence of greater demographic homogeneity within Japan. A group's general level of homogeneity

will affect how noticeable similarities and dissimilarities will be within it (Blau, 1977). When we compared the Japanese top managers we studied with those in U.S. studies (Jackson et al., 1991; Wiersema & Bantel, 1993), the Japanese group exhibited significantly greater homogeneity in demographic characteristics, as shown in Table 6. The homogeneity of Japan's population and organizational preferences for internal labor markets may contribute to the higher level of homogeneity in both age and organizational tenure observed in Japanese top management teams. Demographic homogeneity in turn heightens attention to the existence of even slight differences.

A second reason for differences in the effects of demographic characteristics on organizational outcomes in U.S. and Japanese organizations is the heightened attention to differences among people growing out of divergence in both sociocultural values and the prevailing organizational processes in the two countries. In Japan, the sociocultural value of collectivism encourages conformance and similarity, but in doing so, draws attention to those who do not conform or who are different. Additionally, the absence of strongly defined class differences in Japan gives rise to greater awareness of subclass stratification. Within organizations, business cliques or factions predicated on socioeconomic characteristics such as university affiliation further heighten attention to demographic differences. Similarly, Japanese organizational processes involving intensive socialization efforts administered en masse to new entrants, designed to engender shared values and create group consciousness, sensitize organization members to differences in age and tenure.

The high levels of variance in turnover explained in this study reflect the heightened sensitivity to differences in Japanese organizations. Table 7 compares results of studies of top management team turnover in the United States with those of the present study. For example, our examination of the effects of top team composition indicated that demographic characteristics have significantly greater power in accounting for turnover in the Japanese data than has emerged in U.S. studies. The overall model, including main effects, accounted for a substantially larger proportion of the variance in team turnover (41 percent for all team turnover; 78 percent for turnover excluding retirements) than comparable results of U.S. studies (2 and 9 percent, respectively [Wiersema & Bantel, 1993]; 22 percent for all exits [Jackson et al., 1991]). Both trait and heterogeneity effects were more significant in predicting top team turnover in Japanese organizations than they have been found to be in U.S. firms.

Mean demographic traits were highly significant in explaining top team turnover in Japan but have been much less significant in U.S. findings. Of the demographic traits, only mean team tenure has been found to predict top team turnover in U.S. studies (Wiersema & Bantel, 1993). The present study also found that younger top management teams in Japanese firms experienced higher levels of turnover and that younger managers had a greater likelihood of leaving firms. Additional analysis revealed that for executives younger than 51 years of age, the rate of turnover was 100 percent, and for

TABLE 6
Comparison of Japanese and U.S. Top Management Team Demographic Characteristics

Variables	U.S. Studies				Comparison of Means ^a	
	Wiersema and Bird		Jackson and Colleagues		Wiersema and Bird vs. Jackson and Colleagues	Wiersema and Bird vs. Wiersema and Bantel (1993)
	Means	s.d.	Means	s.d.		
Age heterogeneity	.09	.05	.18	.13	5.77**	
Organizational tenure heterogeneity	.32	.23	.58	.24		
Team tenure heterogeneity	.97	.34			5.90**	3.54**
Sample size	40		93		.71	3.95**
				85		

^a Z-test scores are used for mean comparisons.

** $p < .01$

TABLE 7
Comparison of Japanese and U.S. Top Management Team Turnover

Variables	Wiersema and Bird				U.S. Studies			
	All Turnovers		Turnovers Under Age 65		Jackson and Colleagues		Wiersema and Bantel (1993)	
	Turnovers	ΔR^2	Under Age 65	ΔR^2	All Turnovers	ΔR^2	All Turnovers Under Age 65	ΔR^2
Control								
Mean team age	-.58***	.29***	-.66***	.62***	.12	.00	-.17*	.02*
Mean team tenure								-.29***
Heterogeneity								.09***
Age	.05		.23**		.35*			
Organizational tenure	-.05		-.08		-.08			
Team tenure	-.09		.30**					
Education curriculum					.20†	.22**	.01	.00
University prestige	.41**	.12**	.38***	.16**			.04	.01
Total adjusted R^2	.41***	.41***	.38***	.78***		.22**	.02†	.09***

† $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$

executives 51 to 55 years of age, it was 87 percent. The negative relationship between mean team age and team turnover is counterintuitive and has not previously emerged.

The incidence of turnover may be higher for younger managers because of an external factor—good career opportunities outside their current firms—as well as an internal factor: the apparent power of the CEOs or dominant coalitions in their firms. Our investigation of the younger executives who left revealed that about half did so to take similar or higher positions at rival firms. Because of policies encouraging the use of internal labor markets, over time many firms may lack the requisite skills for successful competition when their strategic domains change. A firm faced with the need to incorporate new logics quickly may choose to recruit young managers from its competitors. Such practices undoubtedly led to higher levels of voluntary job shifting for talented young executives.

Another potential explanation for the higher levels of turnover among young managers lies in the extent of discretion that Japanese CEOs have in selecting members of their top teams. Many departing young executives left firms that were headed by CEOs with reputations for keeping a tight rein on their boards and for making short shrift of possible rivals. A CEO may purposefully not reappoint a young team member as part of a preemptive strike against a potential pretender to the throne. Additional analysis found that when a new CEO came in before the previous CEO had reached the age of 65, the incidence of top team turnover more than doubled. A CEO's attempt to retain power by removing possible successors may lead to higher levels of departures for younger managers.

Our examination of heterogeneity effects revealed comparable or higher levels of explanatory power, despite significantly lower levels of heterogeneity on comparable demographic variables. These findings indicate that heterogeneity on age, team tenure, and university prestige were significant predictors of top team turnover in Japanese organizations. Of the heterogeneity measures examined, only organizational tenure was not a significant predictor of team turnover. The lack of significance for this variable may be a function of its strong negative correlation with mean team age, a strong predictor of team turnover.

In contrast, Wiersema and Bantel (1993) found no significant effects for heterogeneity on either team tenure or education curriculum. Jackson and colleagues (1991), however, found that three variables, age, curriculum, and outside industry experience, accounted for 22 percent of the variation in team turnover. Important methodological differences between the two studies in controlling for the effects of age, and thus retirement, on turnover, may in part explain the differing results. This study's findings of significant heterogeneity effects despite a greater overall level of homogeneity in Japanese top management teams indicate that attention to differences may indeed be greater within Japanese organizations.

In the specific context of turnover in Japanese top management teams, the findings of this study are noteworthy with regard to several points.

Discussions of demographic effects on turnover in the United States have focused on cohesion and integration as the mechanisms that influence individuals to leave or remain. The process leading to departure had been portrayed as passive rather than active, covert rather than overt. People leave because they develop feelings of alienation or have been made to feel alienated, events that may be captured by the existence of managerial cohorts reflected by such demographic characteristics as age and organizational tenure similarity.

In the Japanese context, executive turnover also needs to be analyzed in terms of power and political influence within organizations and in terms of social class distinctions within society. Numerous writers have noted the strong potential for political infighting and maneuvering in Japanese organizations (Bird, 1990; Nakane, 1971; Nakatani, 1988; van Wolferen, 1989; Yoshino, 1968). Given the high level of control over the selection of team members that the CEOs of Japanese firms have, demographic attributes such as team tenure and university prestige, which may reflect top team solidarity, may also be important. Included because of their theoretical links to societal stratification and social-business cliques, both variables made significant contributions to explaining variance in team turnover, strongly suggesting the importance of taking into account the sociopolitical context in which demographic characteristics are embedded.

Variations in ethnological context constituted a rationale for analyzing demographic attributes not previously used in U.S. studies. One of the major distinctions of this study is the finding concerning the importance of team heterogeneity on the prestige of the university attended. Indeed, this proxy for social class was more important than such traditional measures as age and organizational tenure. These findings indicate that there exist managerial cohorts defined by the prestige of the university its members attended, and that university affiliation is an important predictor of top team turnover as well as job procurement and advancement (Bird, 1988; Clark, 1979). By contrast, the findings of Jackson and colleagues (1991) revealed social class, as measured by membership in elite groups, to be rather weak in explaining turnover among U.S. teams.

Finally, in Japanese top management teams, demographic effects on team turnover appear to be independent of age effects. When we examined turnover without controlling for age, most of the departures were actually retirements. The model is less successful at predicting retirements, which are unlikely to be related to the extent of heterogeneity within a group. When we controlled for mean team age, our demographic heterogeneity measures explained a greater amount of the variance in top team turnover. By controlling for retirements at age 65, this study provides a clearer picture of the relationship between top team turnover and demographic heterogeneity.

Several issues related to this study constrain interpretation of its findings. We included CEOs in the analysis as members of top management teams. However, Boeker (1992) pointed out that CEOs wield more power than other team members and are less likely to be dismissed. In view of

Japanese CEOs' power to select team members, it seemed appropriate to ask whether or not CEOs might be affected differently than other members of a team. In additional analyses excluding CEOs, the effects of demographic heterogeneity on team turnover increased significantly. These findings support the idea that CEO turnover may be less likely to be a function of demographic characteristics.

Finally, the organization-level analysis employed six variables to examine 40 observations. The result is that both models in Table 2 have low power, which may explain why some variables demonstrated to be significant in comparable U.S. studies did not exhibit statistical significance here. The fact that other variables manifested significance under conditions of low power further substantiates their explanatory ability.

This study provides new insights into how sociocultural patterns and constraints on variation moderate demography's effect on organizational phenomena. It raises to the surface previously unexamined assumptions of organizational demography theory. Identification and demonstration of the importance of these assumptions substantially alters the way future researchers should develop theory and design empirical investigations. The study's contribution to future research lies in providing a foundation for better-informed theory building. Organizations may vary significantly in ways that constrain variety among employees or that heighten attention to differences as a result of their ethnological context. The results of this study suggest that these external factors may explain why demography may or may not be relevant.

Consideration of ethnological context may also be helpful in identifying other demographic characteristics useful in explaining organizational phenomena. For example, this study of Japanese firms found university prestige to be an important predictor variable. There is strong evidence to indicate that university prestige is applicable in other national settings. France's prestigious *grande ecoles*, for example, define an elite managerial cadre in that country.

Comparative research has often been criticized for doing little more than replicating results or extending theories developed within one country to a new venue (Boyacigiller & Adler, 1991; Poortinga, 1975; Roberts, 1970). If we interpret Boyacigiller and Adler's (1991) recent admonition correctly, the call for research couched in diverse national and cultural contexts is a summons to look inward, not outward, to explore the assumptions underlying our homegrown theories. Exposure to new settings should not simply retest our theories; it should enhance, revitalize, and invigorate them.

REFERENCES

- Abegglen, J. 1956. *The Japanese factory*. Homewood, IL: Free Press.
- Allen, T., & Cohen, S. 1969. Information flow in research and development laboratories. *Administrative Science Quarterly*, 14: 12-19.
- Allen, T., Panian, S., & Lotz, R. 1979. Managerial succession and organizational performance: A recalcitrant problem revisited. *Administrative Science Quarterly*, 24: 167-180.

- Aonuma, M. 1965. *Nihon no keisei* [Japan's executive class]. Tokyo: Tokyo University Press.
- Back, K. 1951. Influence through social communication. *Journal of Abnormal and Social Psychology*, 46: 9-23.
- Bellah, R., Madsen, R., Sullivan, W., Swidler, A., & Tipton, S. 1985. *Habits of the heart: Individualism and commitment in American life*. New York: Harper & Row.
- Benedict, R. 1946. *The chrysanthemum and the sword*. Tokyo: Tuttle.
- Bird, A. 1988. *Nihon kigyō no executive no kenkyū* [Research on Japanese executives]. Tokyo: Sangyo Noritsu Daigaku.
- Bird, A. 1990. Power and the Japanese CEO. *Asian Pacific Journal of Management*, 7: 1-21.
- Blau, P. M. 1977. *Inequality and heterogeneity*. New York: Free Press.
- Boeker, W. 1992. Power and managerial dismissal: Scapegoating at the top. *Administrative Science Quarterly*, 37: 400-421.
- Bond, M. H., & Forgas, J. P. 1984. Linking person perception to behavior intention across cultures: The role of cultural collectivism. *Journal of Cross-cultural Psychology*, 15: 337-352.
- Boyacigiller, N. A., & Adler, N. J. 1991. The parochial dinosaur: Organizational science in a global context. *Academy of Management Review*, 16: 282-290.
- Christopher, R. 1982. *The Japanese mind*. New York: Linden Press.
- Clark, R. 1979. *The Japanese company*. New Haven, CT: Yale University Press.
- Cole, R. 1971. *Japanese blue collar*. Berkeley: University of California Press.
- Cole, R. 1979. *Work, mobility, and participation*. Berkeley: University of California Press.
- Commercial code of Japan*. 1983. Tokyo: Horeisha.
- D'Aveni, R. A. 1989. The aftermath of organizational decline: A longitudinal study of the strategic and managerial characteristics of declining firms. *Academy of Management Journal*, 32: 577-605.
- Dore, R. 1973. *British factory, Japanese factory*. Berkeley: University of California Press.
- Ebadi, Y. M., & Utterback, J. M. 1984. The effects of communication on technological innovation. *Management Science*, 30: 572-585.
- Eitzen, D. S., & Yetman, N. 1972. Managerial change, longevity, and organizational effectiveness. *Administrative Science Quarterly*, 17: 110-116.
- Gamson, W. A., & Scotch, N. 1964. Scapegoating in baseball. *American Journal of Sociology*, 70: 69-72.
- Gudykunst, W., & Ting-Toomey, S. 1988. *Culture and interpersonal communication*. Newbury Park, CA: Sage.
- Hambrick, D. E., & Mason, P. A. 1984. Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review*, 9: 193-206.
- Hatvany, N., & Pucik, V. 1981. An integrated management system: Lessons from the Japanese experience. *Academy of Management Review*, 6: 469-480.
- Hofstede, G. 1980. *Culture's consequences*. Beverly Hills, CA: Sage.
- Inohara, T. 1990. *Human resource development in Japanese companies*. Tokyo: Asian Productivity Organization.
- Jackson, S. E., Brett, J. F., Sessa, V. I., Cooper, D. M., Julin, J. A., & Peyronnin, K. 1991. Some differences make a difference: Individual dissimilarity and group heterogeneity as correlates of recruitment, promotions, and turnover. *Journal of Applied Psychology*, 76: 675-689.

- Japan company handbook.** 1984. Tokyo: Toyo Keizai.
- Kagono, T. 1992. The globalization of management. *Proceedings of the Global Kaisha Conference*.
- Kagono, T., Nonaka, I., Sakakibara, K., & Okumura, A. 1985. *Strategic vs. evolutionary management: A U.S.-Japan comparison of strategy and organization*. Amsterdam: North-Holland.
- Kaisha shokuin roku** [Registry of company executives]. 1986. Tokyo: Daiyamondosha.
- Katz, R. 1982. The effects of group longevity on project communication and performance. *Administrative Science Quarterly*, 27: 81-104.
- Kidder, L. H. 1992. Requirements for being "Japanese": Stories of returnees. *International Journal of Intercultural Relations*, 16: 383-393.
- Kiesler, C. A., & Kiesler, S. B. 1969. *Conformity*. Reading, MA: Addison-Wesley.
- Kono, T. 1984. *Strategy and structure of Japanese enterprise*. London: Macmillan.
- Lawrence, P., & Lorsch, J. 1967. Leadership and organization performance: A study of large corporations. *American Sociological Review*, 37: 117-130.
- Lincoln, J., Hanada, N., & Olson, J. 1981. Cultural orientations and individual reactions to organizations: A study of employees of Japanese-owned firms. *Administration Science Quarterly*, 26: 93-115.
- Lincoln, J., & Kalleberg, A. 1990. *Culture, control, and commitment*. New York: Cambridge University Press.
- Lott, A. J., & Lott, B. E. 1961. Group cohesiveness, communication level, and conformity. *Journal of Abnormal and Social Psychology*, 62: 408-412.
- McCain, B., O'Reilly, C. A., III, & Pfeffer, J. 1983. The effects of departmental demography on turnover. *Administrative Science Quarterly*, 28: 626-641.
- March, J. G., & Simon, H. 1958. *Organizations*. New York: Wiley.
- Mannari, H. 1974. *The Japanese business leaders*. Tokyo: University of Tokyo Press.
- Michaels, C. E., & Spector, P. E. 1982. Causes of employee turnover: A test of the Mobley, Griffeth, Hand, and Meglino Model. *Journal of Applied Psychology*, 1: 53-59.
- Michel, J., & Hambrick, D. 1992. Diversification posture and top management team characteristics. *Academy of Management Journal*, 35: 9-37.
- Mills, G. 1978. *On the board*. Hampshire, England: Gower.
- Mobley, W. H., Griffeth, R. W., Hand, H. H., & Meglino, B. 1979. Review and conceptual analysis of the employee turnover process. *Psychological Bulletin*, 86: 493-522.
- Murray, A. 1989. Top management group heterogeneity and firm performance. *Strategic Management Journal*, 10: 125-141.
- Nakane, C. 1971. *Japanese society*. Berkeley: University of California Press.
- Nakatani, I. 1988. *The Japanese firm in transition*. Tokyo: Asian Productivity Organization.
- Nikkei sangyo shinbun.** 1987. Endaka no toppu no kyoshu [The influence of the high yen on top management]. January: 24.
- Obunsha (Eds.). 1987. *Zenroku daigaku shin gokaku kinyo ranking: Gakubuhin* [Nation-wide rankings of universities based on acceptance rates]. Tokyo: Obunsha.
- O'Reilly, C. A., III, Caldwell, C., & Barnett, D. 1989. Work group demography, social integration, and turnover. *Administrative Science Quarterly*, 34: 21-37.
- Ouchi, W., 1981. *Theory Z*. New York: Addison-Wesley.

- Ozaki, R. 1979. *The Japanese*. Tokyo: Tuttle.
- Pelz, D., & Andrews, F. 1966. *Scientists in organizations*. New York: Wiley.
- Pfeffer, J. 1981. *Power in organizations*. Marshfield, MA: Pitman.
- Pfeffer, J. 1983. Organizational demography. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, vol. 5: 299-357. Greenwich, CT: JAI Press.
- Poortinga, Y. 1975. Some implications of three different approaches to intercultural comparisons. In J. Berry & W. Lonner (Eds.), *Applied cross-cultural psychology*: 327-332. Amsterdam: Swets & Zeitlinger.
- Puffer, S. M., & Weintrop, J. B. 1991. Corporate performance and CEO turnover: The role of performance expectations. *Administrative Science Quarterly*, 36: 1-19.
- Reischauer, E., & Craig, A. 1978. *Japan: Tradition and transformation*. New York: Houghton Mifflin.
- Rhodes, S. 1983. Age-related differences in work attitudes and behavior: A review and conceptual analysis. *Psychological Bulletin*, 93: 328-367.
- Roberts, K. H. 1970. On looking at an elephant: An evaluation of cross-cultural research related to organizations. *Psychological Bulletin*, 74: 327-350.
- Roberts, K. H., & Boyacigiller, N. A. 1984. Cross-national research: The grasp of the blind men. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior*, vol. 6: 423-475. Greenwich, CT: JAI Press.
- Roberts, K. H., & O'Reilly, C. A., III. 1979. Some correlates of communication roles in organizations. *Academy of Management Journal*, 22: 42-57.
- Rogers, E., & Shoemaker, F. 1971. *Communication of innovations*. New York: Free Press.
- Rohlen, T. 1973. *For harmony and strength*. Berkeley: University of California Press.
- Ryder, N. B. 1965. The cohort as a concept in the study of social change. *American Sociological Review*, 30: 843-861.
- Sekimoto, M., & Hanada, M. 1985. Juissha 4,539 mei no chosa bunseki ni motosuku kigyō kizoku ishiki no kenkyū, jo [Research on organizational commitment based on a survey analysis of 4,539 workers in eleven companies, part 1]. *Diamond Harvard Business*, 10 (October-November): 84-96.
- Sekimoto, M., & Hanada, M. 1986. Juissha 4,539 mei no chosa bunseki ni motozuku kigyō kizoku ishiki no kenkyū, ge [Research on organizational commitment based on a survey analysis of 4,539 workers in eleven companies, part 2]. *Diamond Harvard Business*, 11 (December-January): 53-62.
- Shaw, M. E. 1976. *Group dynamics: The psychology of small group behavior*. New York: McGraw-Hill.
- Shaw, M. E., & Shaw, L. M. 1962. Some effects of sociometric grouping upon learning in a second grade classroom. *Journal of Social Psychology*, 57: 453-458.
- Shimizu, R. 1980. *The growth of firms in Japan*. Tokyo: Keio Tushin.
- Shiotsugu, K. 1986. Keiisha kotairon no keifu to kasetu, II: Bunka henyō apuro-chi no kanosei [CEO succession theory history and hypotheses, II: The possibility of a cultural change approach]. *Matsuyama Shodai Ronshu*, 37(5): 31-48.
- Singer, K. 1983. *Mirror, sword, and jewel*. Tokyo: Kosansha International.
- Spence, M. 1975. *Market signaling*. Cambridge, MA: Harvard University Press.
- Stinchcombe, A., McDill, M., & Walker, D. 1968. Demography of organizations. *American Journal of Sociology*, 74: 221-229.
- Taira, K., & Wada, T. 1987. Business-government relations in modern Japan: A today-jakkai-

- zaikai connection? In M. Mizuchi & M. Schwartz (Eds.), *Intercompany relations: The structural analysis of business*: 264–297. Cambridge: Cambridge University Press.
- Triandis, H. 1986. Collectivism vs. individualism. A reconceptualization of a basic concept in cross-cultural psychology. In Bagley C. & Verma G. (Eds.), *Personality, cognition, and values*: 60–95. London: Macmillan.
- van Wolferen, K. 1989. *The enigma of Japanese power*. London: Macmillan.
- Wagner, W., Pfeffer, J., & O'Reilly, C. A., III. 1984. Organizational demography and turnover in top management groups. *Administrative Science Quarterly*, 29: 74–92.
- Wiersema, M., & Bantel, K. 1992. Top management team demography and corporate strategic change. *Academy of Management Journal*, 35: 91–121.
- Wiersema, M., & Bantel, K. 1993. Top management team turnover as an adaptation mechanism: The role of the environment. *Strategic Management Journal*, 14: 485–504.
- Yoshino, M. Y. 1968. *Japan's managerial system: Tradition and innovation*. Cambridge, MA: MIT Press.
- Zenger, T. R., & Lawrence, B. S. 1989. Organizational demography: The differential effects of age and tenure distributions on technical communication. *Academy of Management Journal*, 32: 353–376.

Margarethe F. Wiersema is an assistant professor in strategic management at the Graduate School of Management at the University of California, Irvine. She received her M.B.A. and Ph.D. degrees in strategic management from the University of Michigan. Her primary research interests center on top management, executive succession, strategic change, and organizational strategic capabilities.

Allan Bird is an assistant professor of management and international business at New York University. He received his M.A. degree in comparative culture and international management from Sophia University in Tokyo and Ph.D. degree in organizational studies from the University of Oregon. His primary research interests center on Japanese top management teams, strategic human resource management, and the management of expatriates.

RESOURCE ALLOCATION AS AN OUTCROPPING OF STRATEGIC CONSISTENCY: PERFORMANCE IMPLICATIONS

JEFFREY S. HARRISON

University of Central Florida

ERNEST H. HALL, JR.

University of Southern Indiana

RAJENDRA NARGUNDKAR

Vignana Jyothi Institute of Management

Similarities in financial resource allocations across the lines of business of diversified firms may indicate corporate strategic consistency, which may lead to superior corporate performance. In support of this argument, the variance in R&D intensity across the lines of business of 96 diversified firms was found to be inversely related to industry-adjusted return on assets. However, no relationship was found for capital intensity. These results provide partial support for the usefulness of a resource-based approach to the study of diversification strategy.

The increase in the diversification of business organizations in the United States and elsewhere over the past several decades has been accompanied by an increase in research on the topic. Hoskisson and Hitt (1990) included 254 citations in their review of the diversification literature (cf. Ramanujam & Varadarajan, 1989). Although much of this research has centered on the relationship between diversification and financial performance, contradictory findings have made it difficult for researchers to agree on which of many alternative theories best represents this critical relationship (Hoskisson & Hitt, 1990). Of particular concern is the role of relatedness among a firm's diversified businesses in producing synergy and thus higher performance.

The purpose of this article is to present theory and empirical evidence that support a resource-based view of the relationship between diversification and performance (Barney, 1988; Harrison, Hitt, Hoskisson, & Ireland, 1991; Mahoney & Pandian, 1992; Wernerfelt, 1984). The resource-based view, which focuses on the management of firm resources to produce a sustainable competitive advantage, is in harmony with some of the tradi-

We gratefully acknowledge the support of the Department of Management at Clemson University, where most of this research was conducted. We would also like to thank Michael Stahl, Caron St. John, Stephen Cantrell, and two anonymous reviewers for this journal; their advice greatly enhanced the quality of this project and the final article.

tional diversification literature. However, it also provides unique perspectives on the relatedness-performance relationship. We developed these perspectives and tested some resulting hypotheses. In particular, our hypotheses concern the performance effects of resource allocation similarities among the lines of business of large, diversified firms over a seven-year period.

THEORY AND HYPOTHESES

The traditional product-market approach to conceptualizing and measuring diversification has limitations. We offer an alternative approach stemming from the resource-based view of firms.

Traditional Perspectives on Diversification

Many management scholars believe that relatedness among the lines of business of diversified firms results in higher performance (e.g., Bettis, 1981; Bettis & Mahajan, 1985; Capon, Hulbert, Farley, & Martin, 1988; Davis, Robinson, Pearce, & Park, 1992; Lubatkin & Rogers, 1989; Rumelt, 1974, 1982; Shelton, 1988; Varadarajan & Ramanujam, 1987; Wernerfelt & Montgomery, 1986). However, researchers have reported both results that support that idea and results that do not (e.g., Amit & Livnat, 1988; Bettis & Hall, 1982; Dubofsky & Varadarajan, 1987; Grant & Jammie, 1988; Grant, Jammie, & Thomas, 1988; Michel & Shaked, 1984; Palepu, 1985). These discrepancies are sometimes traceable to the influence of differing perspectives and methodologies (Hoskisson & Hitt, 1990; Montgomery, 1979; Venkatraman, 1989). A closer examination of widely used measures of relatedness and supporting theoretical explanations will help bring these issues to light.

Most empirical studies of the relatedness construct have made use of output-based measures that rely on product, market, or technological similarities within a diversified firm's business portfolio (e.g., Capon et al., 1988; Montgomery & Wernerfelt, 1988; Nathanson & Cassano, 1982; Palepu, 1985; Rumelt, 1974, 1982; Shelton, 1988; Simmonds, 1990; Varadarajan & Ramanujam, 1987). For example, in one of the most frequently cited studies, Rumelt defined lines of business as related if they were "tangibly related to the collective skills and strengths possessed originally by the firm" (1974: 11). He observed three types of relatedness: "(1) relationships among markets served and distribution systems; (2) relationships based on similar production technologies; or (3) the exploitation of science-based research" (Rumelt, 1974: 17).

In another widely cited study, Palepu (1985) employed the Jacquemin and Berry (1979) entropy measure, which is based on the Standard Industrial Classification (SIC) system created by the United States Department of Commerce. SIC codes are based on traditional industry groupings in the U.S. economy. For example, the two-digit "major group 33" is used to identify businesses that are engaged in primary metal industries. The major group is then divided into three-digit groups such as blast furnaces (331), iron and

steel foundries (332), and primary metal industries (333). These groups are then divided into more specific four-digit industries such as copper (3331) and lead (3332). According to Jacquemin and Berry (1979), businesses are related if they are involved in different four-digit industries within the same major two-digit group.

In theory, similarities among products, markets, or technologies, as identified with measures such as those described above, should lead to synergies, often through economies of scope (Panzer & Willig, 1981; Rumelt, 1982; Teece, 1980). Synergies can arise from tangible similarities among businesses that allow the combining of physical processes, such as use of the same marketing channels for several related products or use of excess production capacity to produce an additional product. Synergies may also arise from intangible resource commonalities that result in an ability to share management expertise or know-how across several related business segments (Porter, 1985, 1987).

Although output-based approaches to the measurement of relatedness are often considered valid indicators for the potential for resource-based synergies, these synergies may never be realized (Nayyar, 1992), which may partially explain the contradictions noted earlier. One reason for this loss of potential could be that some related diversification strategies are well formulated but inappropriately implemented. For example, Hill, Hitt, and Hoskisson (1992) discovered that high performance in related-diversified firms is partially dependent on high centralization of control, high integration of activities, use of both subjective and objective criteria in evaluating divisional performance, and incentive schemes that are linked to the profitability of an entire corporation.

Another reason companies may not realize synergies is that the potential for synergies based on intangible resources relies on assumptions that business units producing similar products or marketing goods to similar customers use similar management techniques or share a strategic focus. These assumptions may not always be valid. For example, it is possible for two companies to produce the same product but have very different perspectives on the usefulness of research and development in the way it is produced (Porter, 1985). In addition, the same two companies may have dissimilar capital structures, with one company favoring human labor and customization while the other emphasizes a more highly automated production process and standardization. This type of diversity is common in industries such as steel and automobiles.

A resource-based view of diversification can overcome some of the limitations associated with traditional product- or market-based diversification theory and research (Harrison et al., 1991; Mahoney & Pandian, 1992; Wernerfelt, 1984). From a resource-based perspective, the management of firm resources is closely linked to both strategy formulation and strategy implementation, but the use of traditional measures encourages a focus on strategy formulation only. In addition, similar levels of investment in resources such

as R&D and capital across the lines of business of a diversified firm could be a sign of consistency in dominant logic, distinctive competency, or other organizational factors.

A Resource-based Perspective on Diversification

From a resource-based view, business executives should manage diversified resources so as to achieve a sustainable competitive advantage (Barney, 1991), which should lead to short- and long-term economic profits (Mahoney & Pandian, 1992). Barney classified firm resources into three types: physical (Williamson, 1975), human (Becker, 1964), and organizational (Tomer, 1987). Most closely related to the present study's concerns are (1) human resources, organizational elements such as the training, experience, judgment, intelligence, and insight of a firm's managers, and (2) organizational resources, which include the firm's formal and informal planning, controlling, and coordinating systems and its formal reporting structure.

According to Mahoney and Pandian, unique capabilities arising from technical know-how and managerial ability "are important sources of heterogeneity that may result in sustained competitive advantage" (1992: 365). Distinctive competence and superior organizational routines may enable a firm to generate profits (e.g., economic rents) from a resource advantage (Hitt & Ireland, 1985; Mahoney & Pandian, 1992). Citing Penrose (1959), Mahoney and Pandian continued, "A firm may achieve rents not because it has better resources, but rather the firm's distinctive competence involves making better use of its resources" (1992: 365)."

Harrison and colleagues (1991) recently investigated the issue of whether resource allocation similarities or differences between acquiring firms and their targets are associated with better management of combined resources in post-merger periods. Specifically, they compared acquiring and target firm premerger expenditure levels in key strategic areas such as R&D. Surprisingly, they discovered that differences, not similarities, in expenditure levels were associated with higher financial performance. They explained that their findings were primarily a result of the competitive bidding process for acquisitions, which tends to result in acquiring firms' paying higher premiums when they are strategically similar to their targets (Barney, 1986, 1988).

Although the bidding process argument applies well to acquisitions, it is not compelling in the case of a firm with an established portfolio of businesses. One reason for the discrepancy is that a lot of diversification occurs through internal development (Porter, 1987), where the external bidding process does not apply. Also, even in the case of acquisitions, the short-term effects and high costs, such as premiums, attorney and advise-ment fees, and transaction costs, are likely to be dissipated over the long term, especially as the operations of the acquired firm are integrated into its parent.

Harrison and colleagues (1991) also explained that acquiring firms may have the opportunity to satisfy unmet needs in their existing business portfolios through acquisitions. Citing the example of a food processor acquiring

a food packager, they stated that the complementarity of these two businesses could lead to synergy. However, both those authors and Stewart, Harris, and Carleton (1984) discovered that firms tended to acquire targets with resource allocation similarities, not dissimilarities (cf. MacDonald, 1985; Montgomery & Hariharan, 1991). Therefore, we concluded that the performance effects Harrison and colleagues found were due primarily to the bidding process and not resource complementarity.

In summary, we contend that resource similarities, not differences, among the lines of business of diversified firms are likely to lead to higher performance. In a sense, this idea conflicts with classic portfolio theory, which advocates that a firm's businesses be positioned at different stages of the product life cycle, a pattern that implies varying demands for capital and R&D. In other words, a strategy that makes sense from a cash flow perspective may not lead to effective management of resources.

Dominant Logic and Resource Allocations

Mahoney and Pandian contended that "a rich connection among the firm's resources, distinctive competencies and mental models or 'dominant logic' . . . of the managerial team drives the diversification process" (1992: 365). A firm's dominant logic consists of a knowledge structure and a set of management processes that are acquired through the experiences of managers during their careers (Prahalad & Bettis, 1986). Furthermore, these experiences are influenced by the dominant business of a firm, which Prahalad and Bettis called the core business. As those authors explained: "The characteristics of the core business, often the source of top managers in diversified firms, tend to cause managers to define problems in certain ways and develop familiarity with and facility in the use of those administrative tools that are particularly useful in accomplishing the critical tasks of the core business" (1986: 491). According to Prahalad and Bettis, managers consider few organizational events as being totally unique or requiring detailed analysis. Instead, they process events through preexisting knowledge systems known as schemata (Norman, 1976). Schemata represent beliefs, theories, and propositions that are developed over time through participation in certain firms and businesses. Therefore, managers of different firms within strategically similar businesses or industries may have similar schemata as a result of their personal experiences in those businesses.

Prahalad and Bettis (1986) reasoned that differences in the strategic characteristics of the businesses in a firm's portfolio can influence the ability of top managers to successfully manage the firm. In other words, managers may learn to be successful in the core business or in businesses that are strategically similar to the core business but may not have the skills necessary to be successful in businesses with different strategic characteristics. Also, Grant explained that the effectiveness with which corporate managers of diversified firms allocate resources among businesses and guide and coordinate business unit strategies "is determined, in part, by the ability of top management to apply similar knowledge and systems to the different busi-

nesses within the firm (1988: 640). Relatedness based on a common dominant logic may transcend traditional relatedness boundaries based on products, markets, or technologies.

One possible extension of these arguments is that businesses that allocate strategic resources in similar ways are more likely to share a similar dominant logic than those that do not. Prahalad and Bettis recognized the link between dominant logic and resource allocations in stating that "a dominant general management logic is defined as the way in which managers conceptualize the business and make critical resource allocation decisions" (1986: 490).

These concepts will now be developed around two strategic resource variables, R&D and capital expenditures, both of which have been found to be important in strategic management research (Baysinger & Hoskisson, 1989; Baysinger, Kosnik, & Turk, 1991; Franko, 1989; Fryxell, 1990; Harrison et al., 1991; Hoskisson & Hitt, 1988; Montgomery & Hariharan, 1991).

R&D Resource Allocations as a Source of Strategic Information

Resource allocations across business units can be a source of strategic information. In particular, similarity in R&D resource allocations across lines of business can signal two strategically relevant phenomena: firm involvement in industries having similar requirements for R&D because they are in the same stage in the business life cycle, or an attempt on the part of corporate executives to manage lines of business similarly. According to the theory of dominant logic developed earlier, these two phenomena are inseparably intertwined; that is, the dominant logic developed in a firm's core business is likely to influence both its selection of businesses in which to compete (Harrison et al., 1991; Stewart et al., 1984) and the way businesses are managed (Prahalad & Bettis, 1986).

A consistent pattern of high R&D intensity across lines of business, regardless of the reason for it, is likely to make skill and knowledge transference through executive transfers, promotions, and other means easier and more effective. But if one business does not share the corporate emphasis on R&D, it likewise may not fit the dominant logic of the corporation. We would expect such a lack of fit to reduce the ability of corporate managers to understand the outlier business unit and the conditions necessary for its success. The effectiveness of skill and knowledge transference through executive transfers and promotions may also be reduced.

Alternatively, a corporation with a dominant logic that places a low emphasis on R&D activities can experience similar difficulties in managing a line of business that requires large allocations to R&D to remain competitive. In this case, corporate executives are unlikely to appreciate the competitive conditions of the outlier business unit. Likewise, a manager who is transferred from a core unit of the firm to the outlier may not have the skills necessary to make it a success.

Independent of the dominant logic arguments is the following: a firm that encourages large allocations to R&D across all its businesses may also be

trying to develop a distinctive corporate competence in research (Hitt & Ireland, 1985, 1986). Stalk, Evans, and Shulman (1992) referred to distinctive corporate competencies as core capabilities, business processes that are critical to success across multiple units (and multiple stages of the value chain) within an organization. Because core capabilities are "everywhere and nowhere" (Stalk et al., 1992: 62), no one executive or business unit controls them.

The corporate emphasis in an organization that is developing a core capability is not on products and markets, but on improving particular business processes to such an extent that they lead to a sustainable competitive advantage (Stalk et al., 1992). Hitt and Ireland (1986) argued that even in firms that are classified as unrelated-diversified using traditional relatedness criteria, there may be some common distinctive competencies that can be applied across businesses that will promote higher overall performance in the corporation. Therefore, similar R&D resource allocations to different lines of business may be associated with an attempt to develop a distinctive competence or core capability in this area.

On the other hand, varying levels of R&D expenditures across lines of business may be associated with totally different business-level strategies. Scarpello, Boulton, and Hofer (1986) suggested that new product leadership first requires a wide range and high level of R&D commitments, then process development, and finally, product development. However, an imitator strategy requires very little or no R&D.

High or low levels of R&D expenditures may also be associated with other organizational factors. For example, highly research-intensive firms employ many highly trained professionals and specialists. Professional employees desire freedom from bureaucratic rules and authority (Podsakoff, Williams, & Todor, 1986). Because of the high levels of training and the rapid product and process changes associated with high levels of R&D, an organic organizational system is probably appropriate in these types of firms (Burns & Stalker, 1961). But firms that place less emphasis on R&D are likely to have workers with less training, as well as slower product and process change; thus, these firms are likely to be more mechanistic.

Inconsistent organizational systems—for example, a mix of organic and mechanistic systems—among lines of business that are or are not research-intensive can make skill transference and proper management difficult. Clashing systems can also make physical resource sharing among business units very difficult, thus reducing the probability of identifying and exploiting synergies based on existing tangible resource commonalities.

Organizational culture is another influence closely related to the organic-mechanistic dimension. It is likely that the culture of a highly R&D intensive firm will develop differently from the culture of a firm that places little emphasis on R&D. Willingness to assume risk, desire for autonomy, and decision making are among the cultural factors that are likely to be affected, with high R&D firms favoring more risk taking and decentralized decision making. Chatterjee, Lubatkin, Schweiger, and Weber (1992) discov-

ered that cultural differences between acquiring firms and their targets were associated with low levels of shareholder return when culture was measured as, among other things, attitude towards risk, autonomy, and decision making.

In summary, firms should diversify in directions that are consistent with their overall corporate emphases on R&D. The arguments contained herein should also extend to corporate performance. Resource allocation similarities among lines of business should lead to more successful transference of skills, knowledge, and experience and greater understanding of a firm's various lines of business by corporate managers. These advantages should lead to higher performance in diversified firms. Stated differently, low variance in R&D intensity across lines of business should lead to higher performance.

Hypothesis 1: Variance in R&D intensity across the lines of business of diversified firms will be inversely related to corporate financial performance.

Some of these arguments also apply to allocations of capital across the lines of business of diversified firms.

Capital Intensity and the Center of Gravity

Harrison and colleagues (1991) discovered that capital-intensive firms sought out other capital-intensive firms as acquisition targets (cf. Montgomery & Hariharan, 1991). However, the effect, although significant in a correlational analysis ($r = .32$, $p < .01$), was not as strong as it was for R&D intensity ($r = .64$). Galbraith and Kazanjian (1986) developed a model that is helpful in understanding why businesses with similar capital requirements may also display other strategic similarities.

The model developed by Galbraith and Kazanjian (1986) is based on the stages of the manufacturing supply chain, which is similar to the value-added industry supply chain found in economics. The upstream supply flow moves from raw materials extraction through primary manufacturing to fabrication. The downstream stages include final product manufacturing, distribution, and retail sale. According to Galbraith and Kazanjian, a company establishes its "center of gravity" by beginning its operations at a particular stage of the supply chain in an industry. Once a company is successful (if it is successful) in mastering the management techniques and processes that are necessary at that stage, strategic changes take place through moves around and from this center of gravity.

Firms that have similar centers of gravity are expected to have similar strategic characteristics (Galbraith & Kazanjian, 1986). For example, firms that engage in raw materials extraction and primary manufacturing (upstream companies) are expected to be much more capital-intensive than companies that produce and market finished goods (downstream companies). The capital-intensive upstream companies are characterized by an emphasis on commodity products, standardization, maximization of the

number of end users of products, low-cost production, line-driven organization structures, process innovation, high emphasis on a capital budget, high levels of technological know-how, and a functional emphasis on manufacturing and engineering. Alternatively, the market-oriented downstream companies are characterized by proprietary products, customization, target marketing, high margins, line and staff-driven structures, product innovation, high emphasis on an advertising budget, high levels of marketing skills, and a functional emphasis on product development and marketing (Galbraith & Kazanjian, 1986).

Consequently, similar capital requirements among lines of business may indicate a narrow dispersion around the center of gravity, which should facilitate effective management and skill and knowledge transference. However, even if lines of business with similar capital resource allocations are not at the same stage of the supply chain, they are still likely to share some strategic characteristics.

Therefore, lines of business that have similar capital requirements may also share other strategic similarities, which should lead to more successful transference of skills, knowledge, and experience and more effective corporate-level management.

Hypothesis 2: Variance in capital intensity across the lines of business of diversified firms will be inversely related to corporate financial performance.

METHODS

Data

Line-of-business data were extracted from the COMPUSTAT data base, specifically the line-of-business segment, which includes information for the seven-year period 1984–90. Since this study focused on diversified firms, companies that were not active in more than one line of business were excluded. Data for the performance and control variables were drawn from the COMPUSTAT primary, secondary, tertiary, full, and research data bases. All variables were averaged over the study period to minimize errors resulting from year-to-year volatility in the measures. Consequently, companies that did not report complete data for at least four of the seven years for each of the variables were dropped from the study.¹

Complete data were available for 96 firms. These firms participated in 203 different four-digit and 55 different two-digit SIC industries. Although the study group is not particularly large, it compares well with the sizes of

¹ A less restrictive inclusion criterion of three years of complete data for each variable resulted in an increase to 133 firms and similar results for the tests of hypotheses. However, the less stable measures caused the model error terms to increase, which resulted in a drop in significance level for some of the models. For example, the significance level of the primary R&D model dropped from $p < .0001$ to $p < .001$. Therefore, we had more confidence in the results using the more restrictive criterion.

the samples used in other, widely cited diversification studies, including Bettis (1981, $N = 80$), Bettis and Hall (1982, $N = 80$), Montgomery (1982, $N = 128$), and Palepu (1985, $N = 30$).² Furthermore, as Table 1 demonstrates, the studied firms represent the distribution of industries in the entire line-of-business data base fairly well. Studied companies averaged sales of \$1.8 billion, assets of \$1.8 billion, and 15,197 employees. Therefore, the results of this study are not generalizable to small firms.

Variables

To examine Hypotheses 1 and 2, we used the variances of R&D intensity and capital intensity across lines of business as measures of the difference or dispersion in resource allocations.³ The intensity variables were calculated in the traditional manner, by dividing R&D expenditures and capital expenditures by sales.

Return on assets (ROA) was the measure of financial performance used in this study. Although accounting-based measures of performance are not without their faults, several researchers have recently defended them (Bromiley, 1986; Jacobson, 1987; Long & Ravenscraft, 1984). Furthermore, since ROA is the most commonly used accounting-based measure of performance in the strategic management literature, its use provides comparability with many past studies of diversification. To control for industry influences, we used a weighted average of the ROA of the dominant four-digit industry of each firm, excluding the firm's own financial figures. The dependent variable was an industry-adjusted measure in which industry ROA was subtracted from firm ROA prior to analysis (Fowler & Schmidt, 1988; Rumelt, 1982).

In addition to industry profitability, four other control variables—leverage, relative market share, firm growth, and diversification—were added to the analysis. We considered leverage important because firms sometimes accomplish diversification through acquisitions that are heavily debt financed, and the correspondingly high interest payments can reduce profitability levels. We calculated leverage as the ratio of long-term debt to total assets. Another common measure of leverage, long-term debt to equity, was not as highly correlated with ROA and was therefore judged inferior.

² Most small or privately held companies are not required to file Securities and Exchange Commission 10-K reports detailing their line-of-business expenditures. Furthermore, of the companies that are required to file 10-Ks, most do not report R&D expenditures by line of business. Standard & Poor's compiles information directly from 10-Ks and annual reports. An exhaustive search of these source documents, which are reproduced on microfiche, would have been prohibitively expensive and unlikely to produce a much larger data set. Consequently, we concluded that any biases that may have resulted from use of the COMPUSTAT line-of-business segment data base were unavoidable (Palepu, 1985).

³ There was no theoretical reason to believe that variance was superior to other potential measures of dispersion. Consequently, in pretests we substituted standard deviation and a measure that compared the highest to the lowest intensity and found comparable results.

TABLE 1
Two-Digit Industry Participation of Companies in the Study and in the
COMPUSTAT Data Base

Two-Digit SIC Code	Description	Lines of Business	Percentage of Sample	Percentage of Data Base
01	Agriculture: Crops	2	0.8	0.3
02	Agriculture: Livestock	1	0.4	0.2
10	Metal mining	1	0.4	1.7
12	Coal mining	1	0.4	0.6
13	Oil and gas extraction	8	3.1	4.9
15	Building construction	1	0.4	1.2
16	Construction other than building	2	0.8	0.5
17	Construction: Special contractors	1	0.4	0.5
20	Food and kindred products	4	1.5	1.9
22	Textile mill products	2	0.8	0.8
25	Furniture and fixtures	1	0.4	0.7
27	Printing and publishing	3	1.1	1.4
28	Chemicals and allied products	18	6.9	4.8
29	Petroleum refining	3	1.1	0.7
30	Rubber and plastics	1	0.4	1.7
31	Leather and leather products	1	0.4	0.3
32	Stone, glass, concrete products	1	0.4	0.9
33	Primary metal industries	4	1.5	1.8
34	Fabricated metal products	9	3.4	2.6
35	Machinery, except electrical	18	6.9	6.8
36	Electrical-electronic machinery	15	5.7	5.9
37	Transportation equipment	8	3.1	2.2
38	Measuring-controlling instruments	16	6.1	5.3
39	Miscellaneous manufacturing	5	1.9	1.3
42	Motor freight	1	0.4	0.8
45	Transportation by air	1	0.4	0.5
47	Transportation services	1	0.4	0.4
49	Electric, gas, and sanitation services	3	1.1	3.3
50	Wholesale: Durable goods	12	4.6	3.6
51	Wholesale: Nondurable goods	10	3.8	2.2
52	Retail: Building materials	4	1.5	3.8
53	Retail: General merchandise	12	4.6	0.8
54	Food stores	9	3.4	0.7
55	Auto dealers and service stations	1	0.4	0.3
56	Apparel-accessory stores	6	2.3	0.5
57	Furniture stores	1	0.4	0.5
58	Eating-drinking places	6	2.3	1.3
59	Miscellaneous retail	11	4.2	1.5
61	Credit agencies	2	0.8	1.8
62	Security-commodity brokers	1	0.4	1.2
63	Insurance	2	0.8	1.7
65	Real estate	9	3.4	2.6
67	Investment offices	7	2.7	3.9
70	Hotels-lodging places	5	1.9	0.6
72	Personal services	1	0.4	0.3
73	Business services	10	3.8	5.5

TABLE 1 (continued)

Two-Digit SIC Code	Description	Lines of Business	Percentage of Sample	Percentage of Data Base
75	Automobile repair services	1	0.4	0.3
76	Miscellaneous repair services	1	0.4	0.2
79	Amusement-recreation services	6	2.3	0.9
80	Health services	2	0.8	1.7
82	Educational services	1	0.4	0.3
87	Other services	10	3.8	3.0

Market power and growth have also been found to be important control variables in studies of this type. The data base provided the information necessary to calculate a measure of relative market share, defined as the sales of a firm in a particular four-digit industry divided by the sales of the largest competitor in that industry. We computed relative market share by averaging this ratio across all of the lines of business in which a firm participated during the study period. Growth was measured as average growth in total firm sales across the period.

Finally, we controlled for firm diversification through the use of entropy measures, which were discussed earlier (Jacquemin & Berry, 1979; Palepu, 1975). We were interested in discovering whether the main predictor variables could explain a significant amount of variance in performance in the presence of more traditional diversification measures. The entropy measures included three components: unrelated diversification, related diversification, and total diversification, which is the sum of unrelated and related diversification. Palepu (1985) provides a detailed description of the computational methods involved.

Statistical Tests

Analysis of variance using SAS procedure GLM was used to test Hypotheses 1 and 2 (SAS Institute, 1985). We first computed the models with the variance measures and three of the control variables, excluding the diversification measures. Each of the three entropy measures was then added in turn. We then divided the data set into an early (1984–86) and a late (1987–90) period to test the stability of the main effects across the time period under study. Only 83 firms were available for use in the early period tests because 13 of the 96 firms studied only reported adequate data for 1987–90. The full group of 96 firms was available for the late period tests. All analyses were cross-sectional, with all the variables representing averages over the particular period under study (three to seven years, depending on the test).

Tests of the interactions between the variance scores and the entropy measures were also conducted to examine the notion that the importance of variance in resource allocations varied with the level of traditionally measured diversification within the firms. These tests did not add much to our

understanding of the relationships being studied.⁴ Therefore, we do not report the interaction test results herein.

RESULTS

Table 2 provides descriptive statistics for the dependent and independent variables and their correlations. Since all the firms studied were diversified, at least to the extent that they were involved in more than one line of business, the negative average industry-adjusted ROA (-3.2%) suggests that diversified firms, on the average, earn low returns (Chang & Thomas, 1989). However, the observed relationship between diversification and profitability was not linear, since higher unrelated diversification was associated with higher profitability. The negative relationship between related diversification and profitability also suggests that a highly complex and somewhat surprising relationship exists between diversification and performance.

The values for related diversification appeared to be low relative to the values for unrelated diversification. Unfortunately, Palepu (1985) did not provide descriptive statistics on the firms he studied as a base for comparison to our data. Consequently, we calculated the diversification measures for all companies in the line-of-business data base over the seven years of the study. We felt that this procedure offered a reasonable comparison because Palepu also used this data base. The data base means ($N = 6,970$ companies) were .176 for unrelated diversification, .012 for related diversification, and .188 for total diversification, compared to .600, .027, and .627 for the 96 firms in our study group. We concluded that the firms we studied were significantly more diversified than the firms in the data base but that the figures were reasonable given our selection criterion of involvement in more than one line of business; the data base includes many single-business companies. Also, Hitt, Hoskisson, Ireland, and Harrison (1991) reported an average total diversification score of 1.628 for firms that were actively engaged in acquisitions.

The two variance measures were not significantly correlated, which could indicate that the measures assessed different things. Accordingly, lines of business that were outliers on one dimension might have fit within an overall corporate focus on the other. Furthermore, the only significant relationship between the variance measures and the entropy measures was demonstrated by a coefficient of $-.20$ between the variance of R&D intensity and unrelated diversification.

Four of the six control variables were significantly correlated with industry-adjusted ROA. Of particular interest was a negative and significant correlation between industry-adjusted ROA and growth in sales. Further analysis revealed a very high mean and standard deviation for growth in sales, an indication that some of the firms studied were growing very fast.

⁴ The only significant interaction effect was a negative interaction between the variance in capital intensity and related diversification for the complete seven-year period. However, this effect was not significant in either the early or late time period. Given the instability of the effect, we chose not to investigate it further.

TABLE 2
Means, Standard Deviations, and Correlations^a

Variables	Means	s.d.	1	2	3	4	5	6	7	8
1. Industry-adjusted ROA	-0.03	0.11								
2. Variance of R&D intensity	0.03	0.21	-.41***							
3. Variance of capital intensity	0.06	0.33	-.03	-.01						
4. Growth in sales	0.84	3.58	-.27**	.13	-.03					
5. Leverage	0.22	0.17	-.13	.11	.01	.10				
6. Relative market share	0.28	0.27	.27**	-.16	.02	-.04	-.10			
7. Unrelated diversification	0.60	0.31	.29**	-.20*	.17	-.22*	-.03	.34***		
8. Related diversification	0.03	0.09	-.32**	.12	-.05	.03	-.13	.14	-.01	
9. Total diversification	0.63	0.32	.19	-.16	.15	-.21*	-.06	.37***	.96***	.28**

^a All values represent averages for the period 1984-90.

* $p < .05$

** $p < .01$

*** $p < .001$

Such high rates of growth, whether through acquisitions or internal development, could have resulted in inefficiencies in some firms. In fact, some firms may have been sacrificing profits for growth. Also observed were a negative and significant relationship between related diversification and performance and a positive and significant relationship between unrelated diversification and performance.

Both the primary regression models, models 1 and 2, were found to be highly significant in explaining firm performance (Table 3). The results of model 1 support the existence of a negative relationship between the variance in R&D and industry-adjusted ROA, after growth in sales, leverage, and relative market share are controlled. These results remained more or less unchanged with each entropy measure introduced (models 1a–1c).

The analyses were also conducted with the control variables in the absence of the R&D variance measure to assess the incremental R^2 attributable to the variance in R&D intensity. The incremental R^2 was .114 ($p < .001$) for the model with no entropy measures, .101 ($p < .001$) for the model with the unrelated entropy measure included, .080 ($p < .01$) for the model with the related entropy measure included, and .111 ($p < .001$) for the model that included the total entropy measure. Consequently, we concluded that the variance in R&D intensity across the lines of business of diversified firms added a significant amount of explanatory power, even in the presence of the control variables. These results offer strong support for Hypothesis 1.

Hypothesis 2 predicts a negative relationship between variance in capital intensity and performance. The results of the second regression model failed to support any significant relationship between firm performance and variance in capital intensity. Furthermore, these results did not change when the entropy measures were added. Therefore, no support was found for Hypothesis 2.

Table 4 gives the results of tests for the effects of period (1984–86 or 1987–90) on variance in R&D intensity. Not only are the results highly significant in both periods, but the R^2 values increased in six of the eight models over values in the models' seven-year counterparts. The variance in R&D intensity coefficients is much larger in the late period, an indication that the R&D effect increased in importance. Overall, these results provide further support for Hypothesis 1.⁵ It is also interesting to note that leverage,

⁵ We also conducted simple tests to examine causality. To test for forward causality, we used variance in R&D intensity during the early period (1984–86) to predict later (1987–90) performance (all the control variables were consistent in time frame with the performance variable). We also used late-period variance in R&D to predict earlier performance, seeking reverse causality. All the models were highly significant ($p < .0001$), which suggests some degree of reciprocal causality—firms do it, it works, so they keep doing it. However, the highest R^2 's were found in the tests of forward causality (.352 for the basic model, .368 for the model with the unrelated diversification variable as a control, .425 for the model with related diversification, and .355 in the model with total diversification). In fact, the individual significance levels for the R&D variable increased to $p < .0001$ in all these models. Therefore, we concluded that the predominant causal direction was forward.

TABLE 3
Results of Regression Analysis for Industry-adjusted ROA

Independent Variables	Industry-adjusted ROA									
	Model 1	Model 1a	Model 1b	Model 1c	Model 2	Model 2a	Model 2b	Model 2c		
Intercept	-.036	-.060*	-.026	-.039	-.042	-.076**	-.029	-.052		
Variance of R&D intensity	-.186***	-.177***	-.158**	-.185***						
Variance of capital intensity					-.013	-.023	-.019	-.015		
Growth in sales	-.007*	-.006*	-.006*	-.007*	-.008*	-.007*	-.007**	-.007*		
Leverage	-.031	-.034	-.060	-.031	-.049	-.053	-.080	-.049		
Relative market share	.082*	.066	.103	.080	.103*	.077	.124**	.095*		
Unrelated diversification		.046				.069				
Related diversification			-.395***				-.454***			
Total diversification				.005				.019		
F	7.92***	6.72***	10.05***	6.27***	3.89**	3.83**	7.05***	3.14*		
R ²	.259	.272	.358	.258	.146	.175	.281	.149		
df	4,81	5,90	5,90	5,90	4,81	5,90	5,90	5,90		

* $p < .05$ ** $p < .01$ *** $p < .001$

TABLE 4
Results of Regression Analysis for Two Periods, R&D Variance Only^a

Independent Variables	Industry-adjusted ROA, 1984-86				Industry-adjusted ROA, 1987-90			
	Model 3	Model 3a	Model 3b	Model 3c	Model 4	Model 4a	Model 4b	Model 4c
Intercept	-.021	-.031*	-.018	-.017	-.010	-.046	-.001	-.029
Variance of R&D Intensity	-.033***	-.032***	-.033***	-.033***	-1.020***	-.960***	-.846***	-1.003***
Growth in sales	-.003*	-.003*	-.003*	-.003*	-.008	-.008	-.007	-.008
Leverage	-.074	-.073	-.084	-.075	-.136*	-.137*	-.169**	-.134*
Relative market share	.062	.056	.074*	.064	.067	.052	.084	.058
Unrelated diversification		.018				.067		
Related diversification			-.137				-.441**	
Total diversification				-.007				.034
F	9.28***	7.41***	8.22***	7.34***	8.18***	7.29***	9.24***	8.68***
R ²	.322	.325	.348	.323	.265	.288	.339	.271
df	4,78	5,77	5,77	5,77	4,91	5,90	5,90	5,90

^a The earlier-period models have fewer observations (N = 83) because 13 of the firms that qualified for the undivided group had complete data for only the last four years. All companies (N = 96) are included in the later models.

* p < .05

** p < .01

*** p < .001

which was not significant in the seven-year tests, became important in the tests of the late period, perhaps because of an increase in acquisitions by these firms and the increasing use of junk bonds and high interest rates to finance such acquisitions.

DISCUSSION

The primary purpose of the present study was to relate differences in the emphases given to two strategic resources across diversified companies' lines of business to overall corporate performance. Results offered support for the idea that consistency across businesses in the emphasis given to R&D is positively associated with corporate performance. However, there was no support for a similar conclusion with regard to capital intensity. Therefore, the results were mixed.

In spite of these mixed results, this study makes an important contribution to diversification research. In the traditional approach to diversification, firms appear to be little more than repositories for the production functions mandated by their lines of business. Accordingly, researchers can assess synergy without regard for intraorganizational structures and processes, by using straightforward processes like comparing SIC codes. We argued previously that one weakness of this approach is that it overemphasizes strategy formulation and virtually ignores strategy implementation.

In contrast, in the approach used, we treated each firm as a unique configuration of resources with the potential for achieving a sustainable competitive advantage. Accordingly, synergy can be assessed by penetrating a firm to evaluate the level of consistency arising from processes such as resource allocation. This type of consistency may result from, among other things, firm involvement in industries that have traditionally been thought to be related, but it is not limited to traditional product-market-industry boundaries. Furthermore, this more subtle measurement approach taps both implementation and execution.

The theory developed herein suggests that firms that maintain a consistent R&D strategy across lines of business may be trying to develop a corporate distinctive competence that, according to Hitt and Ireland (1985), can facilitate effective management of interdependencies among multiple units. Consistency may also be a by-product of the dominant logic of an organization (Grant, 1988; Prahalad & Bettis, 1986). For example, unit managers who have become accustomed to a particular R&D emphasis in their business strategies as they are rising through the ranks are likely to continue this R&D emphasis when they arrive at the corporate level or are transferred to other business units within a corporation.

Similarity or consistency across business segments with regard to R&D intensity could also signal a potential to exploit synergies through economies of scope or scale (Panzar & Willig, 1981; Rumelt, 1982; Teece, 1980). Resource sharing and skill transference should be easier because of similarities among the lines of business in their organizational systems (Burns &

Stalker, 1961), organizational cultures (Chatterjee et al., 1992), or business-level strategies (Fryxell, 1990; Scarpello et al., 1986).

The results contained herein were not consistent with the findings of Harrison and his colleagues (1991), who discovered that differences, not similarities, in resource allocations between acquiring and target firms led to higher post-merger performance. However, as explained earlier, performance effects associated with the bidding process in acquisitions do not necessarily apply to an established portfolio of diversified businesses. For example, Barney (1988) suggested that acquiring firms receive above-normal returns when private or uniquely valuable synergistic assets are involved. Harrison and colleagues argued that "the possibility of uniquely valuable synergy is more likely to occur under dissimilar resource allocations rather than similar resource allocations (1991: 177)." Therefore, the development of a uniquely valuable synergy associated with resource allocation differences may occur only with acquisitions, demonstrating that prescriptions regarding acquisition behavior may not be generalizable to all diversified firms. Method of diversification may be as important as type of diversification, at least in the short term. Inversely, this proposition would certainly explain why theory concerning related diversification does not necessarily hold for acquisitions (Chatterjee, 1986; Elgers & Clark, 1980).

Although this study offers strong support for the notion that consistency in R&D resource allocations across lines of business is positively related to performance, there is no support for the accompanying argument regarding capital intensity. A capital intensity-performance relationship might not occur because, now more than ever, competition requires quick mobility, the ability to enter or leave businesses rapidly as conditions change. Organizations making consistently high capital expenditures may reduce their strategic flexibility, since capital equipment is much less adaptable to new businesses than the knowledge and skills gained through R&D. Alternatively, organizations that consistently allocate small amounts of capital to their lines of business may find themselves uncompetitive because they lack necessary technologies.

Some of the relationships observed in the correlation matrix deserve further explanation. For example, unrelated diversification exhibited a strong positive relationship with performance, but a strong negative relationship was found between related diversification and performance. Furthermore, as indicated by the very small correlation between related diversification and unrelated diversification ($r = -.01$), the firms studied here did not demonstrate a pattern of pursuing related and unrelated diversification simultaneously. This fact aids interpretation of the independent effects of related and unrelated diversification on performance.

On the surface, the positive effect of unrelated diversification on performance was surprising. However, the firms studied here that had high levels of unrelated diversification had low levels of variance in R&D intensity ($r = -.20$, $p < .05$). Combining these results created a picture of efficient unrelated diversification. That is, although some firms diversified

in directions that were outside their traditional product, market, or technological boundaries, exhibiting traditional unrelated diversification, they could still be efficient by diversifying into areas with similar R&D requirements or by consistently emphasizing or deemphasizing R&D within their existing lines of business.

Hoskisson and Johnson (1992) recently demonstrated that during the 1980s, restructuring firms were predominantly organizations that originally had intermediate levels of diversification. Furthermore, they found that most of their restructuring firms were moving away from unrelated diversification. Consequently, the unrelated-diversified lines of businesses that were left would likely have been those with the most positive performance implications. Our findings suggest that higher performance would be expected if the remaining businesses shared a similar R&D emphasis.

The negative relationship between related diversification and performance was also somewhat surprising. However, related diversification was not associated with a consistent pattern of R&D allocations across lines of business. In fact, the coefficient representing this relationship, although not significant ($r = .12$, $p < .23$), was in the opposite direction. This was an important result because it demonstrated that participation in the same major industry group did not necessarily mean that two businesses shared other strategic characteristics.

Also, we defined lines of business as related only if they were in different four-digit industries within the same two-digit major group (Jacquemin & Berry, 1979; Palepu, 1985). Given this classification system, many related-diversified corporations were managing two or more related businesses as separate lines of business, as indicated by separate financial reporting. This form of organization may be inferior to combining related operations into one line of business. In other words, the negative performance effects might be associated with the way the related-diversified firms were structured.

The Resource-based View of Diversified Firms

The findings reported herein lend some support to the viability of a resource-based approach to the study of diversity (Harrison et al., 1991; Mahoney & Pandian, 1992; Wernerfelt, 1984). A key issue in determining whether a resource can generate profits is whether it is idiosyncratic (Barney, 1991; Mahoney & Pandian, 1992). From a transaction-cost-economics perspective, the question is whether the advantages related-diversified firms gain can be just as easily obtained by their competitors as they trade goods and services in an open market (Teece, 1984; Williamson, 1975). If they cannot, a market failure exists.

We suggest, as have many proponents of the resource-based view, that related-diversified firms can create idiosyncratic advantages because some of the resources they control, such as experience, are imperfectly indivisible (Caves, 1982; Prahalad & Bettis, 1986). Also, a firm's resource configuration may itself be idiosyncratic, in that competitors may not be aware of or able

to imitate the configuration, at least in the short term. In fact, the decision makers of some firms may not even be aware that their resource configurations, which may have been prompted by their dominant logics, are providing profits (Mahoney & Pandian, 1992). Causal ambiguity exists when the relationship between the resources a firm controls and the profits they create are imperfectly understood (Barney, 1991). Nevertheless, the results contained herein offer evidence that certain resource configurations do lead to higher profits, whether or not firm executives are fully aware of the reasons for the phenomenon.

Suggestions for Future Research

Future research can overcome some of the weaknesses found in this study. For example, in an effort to maintain an adequately sized study group, we limited the investigation to R&D and capital resources expenditures, which are the only two variables strategically relevant to the theory developed here on which firms publicly and routinely report information by line of business. However, marketing and advertising expenditures are other key resource allocations that may be important in the context of a resource-based theory. The use of other methods for gathering data, such as surveys, could lead to richer and more comprehensive measures of resource allocations among lines of business. Surveys might also help overcome a major weakness of this study, which is its focus on large, publicly traded firms. A question remains as to whether the results reported here are generalizable to small or privately held firms.

Also, the measures of resource configurations used in this study are coarse grained. For example, even though we discovered a relationship between variance in R&D intensity and performance, it may be more important that organizations develop idiosyncratic R&D skills within each of their highly research-intensive lines of business. In so doing, they may be able to develop tacit skills that are difficult to imitate. In fact, the coarse-grained nature of the measures may be another reason that we found no support for the capital intensity hypothesis. Future research could delve deeper into the specific manner in which resources are deployed as firms attempt to develop sustainable competitive advantages.

Another obvious extension of this research would include other indexes of performance, such as measures based on stock values. However, one of the key advantages of market measures is their assumption that the market absorbs all the strategically relevant information about a firm and adjusts the stock price accordingly (Lubatkin & Shrieves, 1986). Unfortunately, the market has sometimes been shown to be inaccurate in assessing the future value of diversification strategies (Schleifer & Vishny, 1991). In the present study, we would not have expected an accurate market assessment of the future performance of a corporation to be based on the consistency of the firm's allocations to R&D across its lines of business. In other words, causal ambiguity might have led to erroneous conclusions. Nevertheless, it might be interesting to see if the market, which represents the collective knowledge of

analysts and investors, is able to detect the performance effects of R&D consistency across lines of business.

In addition to these methodological variations on the present study, more theoretical and empirical work is needed to clarify the relationships that exist between resources, resource configurations, and profits. For example, behavioral and cognitive theory may shed light on the processes and stimuli that lead to various levels and types of resource allocations. Also, organization theory has the potential to explain the different types of structures and systems that are necessary to effectively manage business units with various R&D orientations. In addition, transaction cost economics may help explain the internal resource allocation processes that lead to various resource configurations. Finally, industrial organization economics and classical economics can provide important insights concerning the role of industry in determining a firm's most desirable resource allocation profile.

CONCLUSIONS

Researchers have already recognized a firm's level of R&D intensity as an important determinant of strategic competitiveness (e.g., Franko, 1989; Hitt, Hoskisson, & Harrison, 1991). Also, according to Hoskisson and Hitt (1988), less diversified firms are more research-intensive, and they achieve higher returns for their investments in R&D. Our results complement most earlier findings on R&D by suggesting that consistency in the R&D emphasis of an organization across lines of business is also important to obtaining high organizational performance. However, the results contained herein are not consistent with the findings of Harrison and his colleagues (1991), which implies that theory regarding diversification may not be directly generalizable to acquisitions, and vice versa.

Merging the present results with previous findings on R&D suggests that a consistently high emphasis on R&D across closely related lines of business can provide strategic advantages that are unavailable to diversified firms that do not display such consistency. Alternatively, firms that do not emphasize R&D in one line of business should consistently maintain this position across other lines of business, by, for instance, constraining diversification to industries in which high levels of R&D are not essential to success.

The resource-based measurement approach used in this study was found to be a viable method for uncovering one element of strategic consistency within diversified firms. Other elements may be accessible through similar methods, supplemented with surveys and other data.

REFERENCES

- Amit, R., & Livnat, J. 1988. Diversification and the risk-return trade-off. *Academy of Management Journal*, 31: 154-165.
- Barney, J. 1986. Strategic factor markets: Expectations, luck and business strategy. *Management Science*, 42: 1231-1241.

- Barney, J. 1988. Returns to bidding firms in mergers and acquisitions: Reconsidering the relatedness hypothesis. *Strategic Management Journal*, 9 (Special Issue): 71-78.
- Barney, J. 1991. Firm resources and sustained competitive advantage. *Journal of Management*, 17: 99-120.
- Baysinger, B. D., & Hoskisson, R. E. 1989. Diversification strategy and R&D strategy in multi-product firms. *Academy of Management Journal*, 32: 310-332.
- Baysinger, B. D., Kosnik, R. D., & Turk, T. A. 1991. Effects of board and ownership structure on corporate R&D strategy. *Academy of Management Journal*, 34: 205-214.
- Becker, G. S. 1964. *Human capital*. New York: National Bureau of Economic Research.
- Bettis, R. A. 1981. Performance differences in related and unrelated diversified firms. *Strategic Management Journal*, 21: 379-393.
- Bettis, R. A., & Hall, W. K. 1982. Diversification strategy, accounting-determined risk, and accounting-determined return. *Academy of Management Journal*, 25: 254-264.
- Bettis, R. A., & Mahajan, V. 1985. Risk/return performance of diversified firms. *Management Science*, 31: 785-799.
- Bromiley, P. 1986. *Corporate capital investment: A behavioral approach*. New York: Cambridge University Press.
- Burns, T., & Stalker, G. M. 1961. *The management of innovation*. London: Tavistock.
- Capon, N., Hulbert, J. M., Farley, J. U., & Martin, L. E. 1988. Corporate diversity and economic performance: The impact of market specialization. *Strategic Management Journal*, 9: 61-74.
- Caves, R. E. 1982. *Multinational enterprise and economic analysis*. Cambridge, MA: Harvard University Press.
- Chang, Y., & Thomas, H. 1989. The impact of diversification strategy on risk-return performance. *Strategic Management Journal*, 10: 271-284.
- Chatterjee, S. 1986. Types of synergy and economic value: The impact of acquisitions on merging firms. *Strategic Management Journal*, 7: 119-139.
- Chatterjee, S., Lubatkin, M. H., Schweiger, D. M., & Weber, Y. 1992. Cultural differences and shareholder value in related mergers: Linking equity and human capital. *Strategic Management Journal*, 13: 319-334.
- Davis, S., Robinson, R. B., Jr., Pearce, J. A., III, & Park, S. H. 1992. Business unit relatedness and performance: A look at the pulp and paper industry. *Strategic Management Journal*, 13: 349-362.
- Dubofsky, D., & Varadarajan, P. 1987. Diversification and measures of performance: Additional empirical evidence. *Academy of Management Journal*, 30: 597-608.
- Elgers, P. T., & Clark, J. J. 1980. Merger types and shareholder returns: Additional evidence. *Financial Management*, 9(2): 66-72.
- Fowler, K. L., & Schmidt, D. R. 1988. Tender offers, acquisitions, and subsequent performance in manufacturing firms. *Academy of Management Journal*, 31: 962-974.
- Franko, L. G. 1989. Global corporate competition: Who's winning, who's losing, and the R&D factor as one reason why. *Strategic Management Journal*, 10: 449-474.
- Fryxell, G. E. 1990. Multiple outcomes from product R&D: Profitability under different strategic orientations. *Journal of Management*, 16: 633-646.
- Galbraith, J. R., & Kazanjian, R. K. 1986. *Strategy implementation: Structure, systems and process*. St. Paul: West.

- Grant, R. M. 1988. On "dominant logic," relatedness and the link between diversity and performance. *Strategic Management Journal*, 9: 639-642.
- Grant, R. M., & Jammine, A. P. 1988. Performance differences between the Wrigley/Rumelt strategic categories. *Strategic Management Journal*, 9: 333-346.
- Grant, R. M., Jammine, A. P., & Thomas, H. 1988. Diversity, diversification, and profitability among British manufacturing companies, 1972-84. *Academy of Management Journal*, 31: 771-801.
- Harrison, J. S., Hitt, M. A., Hoskisson, R. E., & Ireland, R. D. 1991. Synergies and post-acquisition performance: Differences versus similarities in resource allocations. *Journal of Management*, 17: 173-190.
- Hill, C. W. L., Hitt, M. A., & Hoskisson, R. E. 1992. Cooperative versus competitive structures in related and unrelated diversified firms. *Organization Science*, 3: 501-521.
- Hitt, M. A., & Ireland, R. D. 1985. Corporate distinctive competence, strategy, industry and performance. *Strategic Management Journal*, 6: 273-293.
- Hitt, M. A., & Ireland, R. D. 1986. Relationships among corporate-level distinctive competencies, diversification strategy, corporate structure and performance. *Journal of Management Studies*, 23: 401-416.
- Hitt, M. A., Hoskisson, R. E., & Harrison, J. S. 1991. Strategic competitiveness in the 1990s: Challenges and opportunities for U.S. executives. *Academy of Management Executive*, 5(2): 7-22.
- Hitt, M. A., Hoskisson, R. E., Ireland, R. D., & Harrison, J. S. 1991. Effects of acquisitions on R&D inputs and outputs. *Academy of Management Journal*, 34: 693-706.
- Hoskisson, R. E., & Hitt, M. A. 1988. Strategic control systems and relative R&D investment in large multiproduct firms. *Strategic Management Journal*, 9: 605-621.
- Hoskisson, R. E., & Hitt, M. A. 1990. Antecedents and performance outcomes of diversification: A review and critique of theoretical perspectives. *Journal of Management*, 16: 461-509.
- Hoskisson, R. E., & Johnson, R. A. 1992. Corporate restructuring and strategic change: The effect of diversification strategy and R&D intensity. *Strategic Management Journal*, 13: 625-634.
- Jacobson, R. 1987. The validity of ROI as a measure of business performance. *American Economic Review*, 77: 470-478.
- Jacquemin, A. P., & Berry, C. H. 1979. Entropy measure of diversification and corporate growth. *Journal of Industrial Economics*, 27: 359-369.
- Long, W. F., & Ravenscraft, D. J. 1984. The misuse of accounting rates of return: Comment. *American Economic Review*, 74: 494-501.
- Lubatkin, M., & Rogers, R. C. 1989. Diversification, systematic risk, and shareholder return: A capital market extension of Rumelt's 1974 study. *Academy of Management Journal*, 32: 454-465.
- Lubatkin, M., & Shrieves, R. E. 1986. Toward reconciliation of market performance measures to strategic management research. *Academy of Management Review*, 11: 497-512.
- MacDonald, J. M. 1985. R&D and the directions of diversification. *Review of Economics and Statistics*, 67: 583-590.
- Mahoney, J. T., & Pandian, J. R. 1992. The resource-based view within the conversation of strategic management. *Strategic Management Journal*, 13: 363-380.
- Michel, A., & Shaked, I. 1984. Does business diversification affect performance? *Financial Management*, 13(4): 18-25.

- Montgomery, C. A. 1979. *Diversification, market structure, and firm performance: An extension of Rumelt's model*. Unpublished doctoral dissertation, Purdue University, West Lafayette, IN.
- Montgomery, C. A. 1982. The measurement of firm diversification: Some new empirical evidence. *Academy of Management Journal*, 25: 299–307.
- Montgomery, C. A., & Hariharan, S. 1991. Diversified expansion by established firms. *Journal of Economic Behavior and Organization*, 15: 71–89.
- Montgomery, C. A., & Wernerfelt, B. 1988. Diversification, Ricardian rents, and Tobin's q . *Rand Journal of Economics*, 19: 623–632.
- Nathanson, D. A., & Cassano, J. S. 1982. Organization, diversity and performance. *Wharton Magazine*, 6(4): 19–26.
- Nayyar, P. R. 1992. On the measurement of corporate diversification strategy: Evidence from large U.S. service firms. *Strategic Management Journal*, 13: 219–235.
- Norman, D. 1976. *Memory and attention* (2d ed.). New York: Wiley.
- Palepu, K. 1985. Diversification strategy, profit performance and the entropy measure. *Strategic Management Journal*, 6: 239–255.
- Panzar, J. C., & Willig, R. D. 1981. Economies of scope. *American Economic Review*, 71: 268–272.
- Penrose, E. T. 1959. *The theory of the growth of the firm*. New York: Wiley.
- Podsakoff, P. M., Williams, L. J., & Todor, W. D. 1986. Effects of organizational formalization on alienation among professionals and nonprofessionals. *Academy of Management Journal*, 29: 820–831.
- Porter, M. E. 1985. *Competitive advantage: Creating and sustaining superior performance*. New York: Free Press.
- Porter, M. E. 1987. From competitive advantage to corporate strategy. *Harvard Business Review*, 65(3): 43–59.
- Prahalad, C. K., & Bettis, R. A. 1986. The dominant logic: A new linkage between diversity and performance. *Strategic Management Journal*, 7: 485–501.
- Ramanujam, V., & Varadarajan, P. 1989. Research on corporate diversification: A synthesis. *Strategic Management Journal*, 10: 523–551.
- Rumelt, R. P. 1974. *Strategy, structure, and economic performance*. Boston, MA: Harvard Graduate School of Business Administration, Division of Research.
- Rumelt, R. P. 1982. Diversification strategy and profitability. *Strategic Management Journal*, 3: 359–369.
- SAS Institute. 1985. *SAS user's guide: Statistics* (5th ed.). Cary, NC: SAS Institute, Inc.
- Scarpello, V., Boulton, W. R., & Hofer, C. W. 1986. Reintegrating R&D into business strategy. *Journal of Business Strategy*, 6(4): 49–56.
- Shelton, L. M. 1988. Strategic business fits and corporate acquisitions: Empirical evidence. *Strategic Management Journal*, 9: 279–288.
- Schleifer, A., & Vishny, R. W. 1991. Takeovers in the '60s and the '80s: Evidence and implications. *Strategic Management Journal*, 12: 51–59.
- Simmonds, P. G. 1990. The combined diversification breadth and mode dimensions and the performance of large diversified firms. *Strategic Management Journal*, 11: 399–410.
- Stalk, G., Evans, P., & Shulman, L. E. 1992. Competing on capabilities: The new rules of corporate strategy. *Harvard Business Review*, 70(2): 57–69.

- Stewart, J. F., Harris, R. S., & Carleton, W. T. 1984. The role of market structure in merger behavior. *Journal of Industrial Economics*, 32: 293-312.
- Teece, D. T. 1980. Economies of scope and the scope of the enterprise. *Journal of Economic Behavior and Organization*, 1: 223-247.
- Teece, D. T. 1984. Economic analysis and strategic management. *California Management Review*, 25(3): 87-110.
- Tomer, J. F. 1987. *Organizational capital: The path to higher productivity and well-being*. New York: Praeger.
- Varadarajan, P., & Ramanujam, V. 1987. Diversification and performance: A reexamination using a new two-dimensional conceptualization of diversity in firms. *Academy of Management Journal*, 30: 380-393.
- Venkatraman, N. 1989. The concept of fit in strategy research: Toward verbal and statistical correspondence. *Academy of Management Review*, 14: 423-444.
- Wernerfelt, B. 1984. A resource-based view of the firm. *Strategic Management Journal*, 5: 171-180.
- Wernerfelt, B., & Montgomery, C. A. 1986. What is an attractive industry? *Management Science*, 32: 1223-1230.
- Williamson, O. E. 1975. *Markets and hierarchies: Analysis and antitrust implications*. New York: Free Press.

Jeffrey S. Harrison is a Galloway associate professor of management at the University of Central Florida. He received a Ph.D. degree in strategic management from the University of Utah. His current research interests include diversification, mergers and acquisitions, CEO succession, ethics, and international strategy.

Ernest H. Hall, Jr. is an assistant professor of management in the School of Business at the University of Southern Indiana. He received his Ph.D. degree in strategic management from the University of Mississippi. His current research interests include corporate strategy, diversity measurement and methodology, mergers and acquisitions, and resource-based perspective of the firm.

Rajendra Nargundkar is an associate professor of marketing at Vignana Jyothi Institute of Management, Secunderabad, India. He has an M.B.A. degree from the Indian Institute of Management and a Ph.D. degree in strategic management from Clemson University. His research interests include diversification and resource-based theory of the firm.

UNDERSTANDING STRATEGIC CHANGE: THE CONTRIBUTION OF ARCHETYPES

ROYSTON GREENWOOD

C. R. HININGS

University of Alberta

We examined the concept of archetype, implicit in a number of contemporary approaches to the study of organizational design and change. Despite an emerging interest in archetypes, the concept has received inadequate investigation. The present article offers a basis for definition of the concept and sets down three assumptions, which we tested using data collected longitudinally from 24 organizations. We present a number of theoretical and methodological implications of the archetype approach to the study of organizational change.

The efforts of organizational theorists to understand the relevance of alternative organizational designs and the dynamics of their evolution may be entering a new phase. There appears to be a growing attraction to the uncovering of organizational archetypes, gestalts, or configurations and growing attention to their transformation and development (e.g., Johnson, 1987; Miller & Friesen, 1980, 1984; Mintzberg, 1983).

An archetype is defined here in terms of two general statements. First, organizational structures and management systems are best understood by analysis of overall patterns rather than by analysis of narrowly drawn sets of organizational properties. This is the "holistic" perspective asserted by Miller and Friesen (1984). Second, patterns are a function of the ideas, beliefs, and values—the components of an "interpretive scheme" (Ranson, Hinings, & Greenwood, 1980)—that underpin and are embodied in organizational structures and systems. An archetype is thus a set of structures and systems that reflects a single interpretive scheme.

Interest in archetypes has proceeded alongside the study of organizational change. Indeed, the central argument of the present research is that archetypes are important for understanding change. Researchers investigating change have increasingly distinguished between incremental change (Lindblom, 1959; Quinn, 1982), and "frame-breaking" (Nadler & Tushman, 1989), or "quantum" change (Hinings & Greenwood, 1988a; Miller & Friesen, 1984; Tushman & Romanelli, 1985). Historically, interest in change has been at a micro level (e.g., Bennis, Benne, & Chin, 1985), a focus that has produced an emphasis on incremental change within archetypes. The dynamics of that process, however, are quite different from those of large-scale change, which involves movement from one archetype to another.

An example of recent interest in frame-breaking change is the punctu-

ated-equilibrium thesis (Abernathy & Clark, 1985; Tushman & Anderson, 1988; Tushman & Romanelli, 1985), whose roots are the life-cycle literature (Kimberly & Quinn, 1984). Organizations are described as experiencing periods of convergence and stability punctuated by reorientations of strategy and design. Neither Abernathy and Clark nor Tushman and colleagues used the term archetype, but their notions of "convergence" and "upheaval" imply both the idea of archetypes, as patterns of structural arrangements, and a definition of change as movement between archetypes.

Similarly, the population ecology school (Astley, 1985; Betton & Dass, 1985; Carroll, 1984; Hannan & Freeman, 1977; Singh, House, & Tucker, 1986) shows attention to archetypes. These researchers define populations of organizations in terms of organizational "forms" having common vulnerability to particular environmental circumstances. The term form is imprecisely defined but is similar to archetype in that it covers the configuration of work patterns. The population ecologists' empirical concern is actually with change in the population of archetypes—their emergence and disappearance—but it is the underlying concept of archetype that is important as a preliminary to our argument.

Despite its contemporary relevance to theorizing about change, the idea of archetypes is inadequately treated in the literature, possibly because theorists are often concerned only secondarily with defining and establishing the existence of archetypes. Much greater interest has been shown in the extent to which, and the conditions under which, organizations change, or move between archetypes. As a consequence, there is no adequate definition or basis for the uncovering and classification of archetypes. And yet, in order to get to grips analytically and empirically with strategic organizational reorientations, it is necessary to conceptualize the scale of change. The concept of archetype gives a basis for doing this by defining what constitutes frame-breaking, strategic change.

This study had three purposes. First, we sought to define the idea of an archetype, highlighting the key role of the underlying interpretive scheme. In doing so, we clarified the main ideas and assumptions of the archetype approach in terms of a core assumption and three hypotheses. Second, we examined the predictions empirically in order to assess whether the idea of archetypes warrants serious further consideration as a means of understanding organizational change. Third, we reviewed theoretical and methodological issues involved in the study of archetypes, as they are defined here. In many respects, this third purpose is reflexive and involves drawing and distilling implications for future research.

ARCHETYPES

The development of interest in archetypes, necessitated by interest in organizational change, represents a return to a central thrust of organizational theory, which is the need to understand organizational diversity through typologies (Lammers, 1978; Weber, 1947). The concept of an archetype im-

plies some form of classification. The idea of coherence between the elements of organizational arrangements is central to typologizing, and the classification of organizations is made according to differences and similarities in overall patterns. As Van de Ven and Drazin wrote, "Subcomponents are related to each other in ways that yield a coherent ensemble (i.e., an overall pattern called organization design). In organization theory these elements have been referred to as ideal types, modes, programs, populations, etc. Much of our theorizing is explicitly in terms of types . . . [that is] basic patterns of organizing that are coherently designed to yield a systematic configuration to the components" (1985: 348). Uncovering patterns of organizing, however, involves two tasks: first, definition of the elements of organizational design; second, resolution of how to recognize and interpret a pattern of those elements.

Elements of Organizational Design

The search for Van de Ven and Drazin's "basic patterns of organizing" requires a multidimensional definition of design. Typically, the emphasis in organizational classification has been structural, with analysts concerned with the differentiation of tasks and positions, the formulation of rules and procedures, and the prescriptions of authority (cf. McKelvey, 1975; Miller, 1981; Mintzberg, 1979; Pugh, Hickson, & Hinings, 1969). This approach is important because of its emphasis on structural forms as instruments for achieving calculable and predictable control of organizational performance. However, it has resulted in structure being taken as definitive of organizational design. Essentially missing from such definitions are the processes and systems that connect and activate structural frameworks. As Pinder and Moore (1979) suggested, multiple parameters need to be employed to capture the complexity of organizational similarities and differences.

Following Daft and Macintosh (1984), we would suggest that an acceptable definition of organizational design has to include coverage of both structure and systems and that there is a developing convergence upon a definition of design as having three essential elements: (1) the vertical and horizontal structures of roles and responsibilities, (2) decision systems, or policy and resource allocation mechanisms, and (3) human resource systems, such as recruitment, appraisal, and compensation. Each element has been analyzed and refined in previous work. The recurring concern is with how organizations manage the complementary issues of differentiation and integration involved in vertical and horizontal allocations of authorities and responsibilities. Commonly used structural dimensions (for review, see Champion [1975], Khandwalla [1977], and Mintzberg [1979]) are the extent of differentiation (e.g., Blau & Schoenherr, 1971); the criteria of differentiation, or the basis for grouping activities (e.g., Blau & Schoenherr, 1971); and the extent of integration (e.g., Galbraith, 1975; Lawrence & Lorsch, 1967).

Miller's (1987) survey identified three dimensions of decision systems: rationality, interaction patterns, and assertiveness. Rationality is the extent to which decisions and resource allocations are the product of careful anal-

ysis, systematic scanning of markets for problems and opportunities, and methodical planning and articulation of strategies (Andrews, 1980; Porter, 1980; Quinn, 1982). Interaction is the degree to which decision making is individual and directive or collective and consensual (Pettigrew, 1973; Wildavsky, 1984). Assertiveness covers the extent to which an organization engages in reactive or proactive behavior and is prepared to assume risk in pursuit of competitive advantage (Miles & Snow, 1978).

Human-resource-system dimensions of organizational design are less well developed than are the structural dimensions, despite growing appreciation of the former's importance (Cummings, 1984; Dyer, 1983; Stonich, 1984). Significant dimensions of human resource systems are the extent to which control is based on a "bureaucratic" or a "clan" form of appraisal (Ouchi, 1977) and the criteria used for recruitment, career development and compensation—whether professional or managerial competence is dominant (Cummings, 1984; Dyer, 1983; Schuler, 1984; Stonich, 1984).

The Basis of Pattern and Classification

Delineating elements of organizational design enables us to deal with our original statement that structures and management systems are best understood in terms of overall patterns rather than by analysis of narrowly drawn sets of organizational properties. But a central problem within the archetype thesis is how to uncover coherent patterns of organizing. Miller and Friesen (1984) used statistical manipulation of large samples of organizations, observed over periods of 20 or more years, to produce configurations of relationships between variables. Mintzberg (1979, 1983) constructed ideal types through a combination of analytical deduction and an extensive, though selective, synthesis of existing research. For us, "The starting point for identification and classification of design archetypes is . . . identification of the interpretive scheme and of how that relates to structural attributes and processes" (Greenwood & Hinings, 1988: 299).

The pattern of an organizational design is a function of an underlying interpretive scheme, or set of beliefs and values, that is embodied in an organization's structures and systems. An archetype is thus a set of structures and systems that consistently embodies a single interpretive scheme. Defining an archetype in this way is a departure from the more common treatment of structures and systems as disembodied attributes of organizations related in an adaptive way to context and performance. Structures and systems, from our perspective, are not neutral instruments but embody—wittingly or otherwise—intentions, aspirations, and purposes (Barley, 1986; Bartunek, 1984; Clegg, 1975; Perrow, 1982).

A range of writings reflects this view of archetypes as configured structures expressing underlying values. Ranson, Hinings, and Greenwood maintained that to fully understand the constitutive structuring of organizational structures over time, an investigation of the "social mechanisms that determine the process of structuring and shape the ensuing structural forms" is necessary (1980: 3). Miller, although he did not explicitly include values as

part of the generation of configuration, wrote of "central, enduring themes that unify and organize" (1987: 697), an idea taken further in *The Icarus Paradox* (Miller, 1991). Tushman and Romanelli (1985) emphasized the importance of the development of new values, norms, beliefs, and rationalizations supporting new strategies, structures, and systems. Their concept of convergence implies that strategies and structures already in place are formulations of values that provide both a logic and a propellant for an organization.

In a study of architectural practices, Blau and McKinley (1979) elaborated a variety of "work motifs," each of which entails a distinct relationship to basic dimensions of organization. A work motif is an intellectual ethos, a set of ideas about the practice of architecture, that results in a particular set of organizational arrangements. This idea is similar to Karpik's (1978) conception of "logics of action," or modes of rationality within organizations that designate "forms of coherence" (cf. Callon & Vignolle, 1976).

In his work on ICI, Pettigrew (1985) wrote of "dominating rationalities or core beliefs" articulated through structural design and organizational processes. Thompson (1975), discussing religious organizations, elaborated the concept of "symbolic appropriateness," whereby organizational practices are geared to the theological position adopted by a church or sect.

These approaches suggest that sets of ideas that have the status of values—or preferences for certain courses of action and outcomes (Beyer, 1981)—underpin organizational structures and processes. We are positing that archetypal coherence comes from the consistent relationship between an interpretive scheme and an organization's structures and systems.

There are two convincing theoretical reasons for anticipating that organizations will develop structures and systems consistent with a single interpretive scheme. Miller and Friesen (1984) provided one such explanation with their concept of "momentum," describing organizations as evolving toward archetypal coherence because for any firm it is better to be one thing consistently than to be a combination of ill-fitting parts. In effect, they acknowledged the economic benefits that flow from coherence. A rather different explanation recognizes organizations as composed of groups whose positions of relative advantage and disadvantage are shaped by the organization's design (Johnson, 1987; Pfeffer, 1981; Walsh, Hinings, Greenwood, & Ransom, 1981). Structures and systems allocate scarce and valued resources and indirectly legitimate and perpetuate distributive inequalities by the consistency of the cues and messages transmitted. An organization's "dominant coalition" will seek to remove discordant structures because of the risk of challenge to the legitimacy of the status quo. Organizations will thus evolve toward archetypal coherence as advantaged groups seek consolidation of political position and control over the distribution of resources.

Critically, the position developed here departs from earlier work on culture, a term we do not use, which also embraces values, beliefs and organizational practices. For our purposes, it is essential to distinguish between the values and beliefs—the interpretive scheme—embodied in an

organization's structures and systems and the extent to which some or all organizational actors are, at a given time, committed to those ideas and values. The term culture is often used to cover both the values and beliefs expressed through structures and systems and the degree to which actors accept and behave in accordance with those values and beliefs. Researchers have seen culture as a system of shared beliefs that underpins structures, commitments, and actions (Kilmann, Saxton, & Serpa, 1985; Sathe, 1985; Schein, 1986). A strong culture thus usually refers to circumstances in which core values and beliefs are widely held throughout an organization and practices and procedures are consistent with those values and beliefs. In contrast, for us the pattern of commitments to one or more interpretive schemes is a potential dynamic of change. For example, an organization's prevailing interpretive scheme (the one embodied in structures and systems) need not be supported by any actors in the organization. At some point in the organization's history it would have been supported, but over time that commitment, for various reasons, waned. However, the structures and systems have remained unchanged because of organizations' known tendency toward inertia. Such a situation would be relatively fragile and amenable to change. We offer these comments to highlight the importance of viewing a pattern of commitments as a dynamic, not a definitional, component of change.

Archetypes and Institutional Specificity

The discussion thus far has defined an archetype as a set of structures and systems consistently reflexive of a single, underpinning interpretive scheme. An important implication of this definition, with its emphasis upon the core significance of the interpretive scheme, is that archetypes are probably institutionally specific.

Organizational theory has traditionally sought to produce theory generalizable across broad classes of organizations. Recently, however, an increasing body of knowledge and research has pushed in the direction of what Child and Smith (1987) referred to as sectoral analysis (e.g., Huff, 1982; Pettigrew, 1985; Spender, 1980; Worthy, 1985). There is disillusionment with overly abstract studies that purport to embrace all organizations, modeling them as disconnected from the contexts that provide meaning to their activities. Institutional theory clearly points to the importance of ideas and values within a sector that limit the range of likely organizational designs. In a review of institutional theory, Scott wrote, "Institutionalized belief systems constitute a distinctive class of elements that can account for the existence and/or elaboration of organizational structure" (1987: 497). In other words, values and beliefs external to an organization play a significant role in determining the manner in which it operates. Meyer and Rowan (1977) originally developed this argument by suggesting that organizations conform to sectoral rules and requirements for reasons of legitimacy and resource flows, an argument that DiMaggio and Powell (1983) and Tolbert and Zucker

(1983) elaborated. More recently, Baum and Oliver (1991) showed that organizations increase their survival capabilities by conforming to institutional norms.

This brief review suggests that the search for archetypes should start within an institutional sphere or industrial sector, for it is there that institutional prescriptions and proscriptions (Hinings & Greenwood, 1988b), or what Child and Smith (1987) and Johnson (1987) referred to as "strategic recipes," will be found.

HYPOTHESES

Two initial hypotheses can be derived from the discussion, both dealing with the existence of archetypes.

Hypothesis 1: Organizations tend to operate through structures and systems that are manifestations of a single, underlying interpretive scheme: they exhibit archetypal coherence.

Hypothesis 2: Organizations that have structures and systems that are not manifestations of a single, underlying interpretive scheme will move toward archetypal coherence.

The archetype thesis suggests that change involving movement between archetypes is highly unusual. Organizations are characterized by convergence toward a prevailing archetypal form and inertia and tend to remain within the assumptions of the existing archetype (Tushman & Romanelli, 1985). "Conservatism" (Child and Smith, 1987) marks normal organizational development, with change "configured in terms of the [existing] paradigm" (Johnson, 1987: 245). Radical change, the passage from one archetype to another—"frame bending," to use Nadler's (1987) phrase—is exceptional. Thus,

Hypothesis 3: Organizations tend to remain within an archetype rather than move between archetypes.

It is worth stressing, however, that the hypotheses are based on the central assumption that archetypes that are discoverable by researchers do exist in institutional arenas and that actual organizational arrangements approximate those archetypes to a greater or lesser degree. In other words, institutionally located prescriptions and proscriptions constrain and influence the design of organizational arrangements, in a fashion unrecognized by organizational participants. In approaching the hypotheses, therefore, our initial task was to validate the assumption of institutional prescriptions by exposing the archetypes operant within institutional settings.

A distinction is being drawn between the hypothesized existence of institutionally prescribed archetypes and their hypothesized, empirically assessable appearance in individual organizations within an institutional sector. Empirically, it is known that organizations exhibit complexity and

variety when examined along dimensions such as the structure of roles and responsibilities, decision systems, and human resource systems. As a result, organizational typologies and taxonomies tend to produce multiple forms (McKelvey, 1982; Mintzberg, 1979; Pugh et al., 1969). Similarly, when one looks for the empirical existence of archetypes, variety will be found, as our data show. We are thus not saying that organizations do not vary because archetypes exist. We are saying that within a given institutional sphere, only a small number of archetypes are legitimated. The number will vary with the extent to which a particular sector is institutionalized. In a very heavily institutionalized sector, there may be only one or two institutionally approved forms at a given time (Hinings & Greenwood, 1988a; Oliver, 1991; Kikulis, Slack, & Hinings, 1992).

Our point, in short, is that two levels of analysis are pertinent. The first is the institutional sector, where the research task is to discover which organizational forms are legitimated. These legitimated forms are the archetype templates and will be few in number. The second level is that of individual organizations, where the research task is to examine the extent to which those organizations do or do not approximate their sector's archetype or archetypes. At this level, there will be more variety, but pressures for archetypal conformity will operate upon individual organizations.

METHODS

In describing the methods we used, we are aware that certain methodological features are important implications of the archetype thesis itself. So a later section reflects not only on the theoretical implications of the study, but also on important methodological implications of the theory as they emerged from the research. In this sense, we depart from the more conventional paradigm of discussing methodology as if it were an abstract and definitive set of procedures. Instead, we described our methods in a manner that permits their subsequent discussion.

Following Van de Ven and Drazin's suggestions (1985: 348), we used a two-stage research design. In the first stage, we examined the assumption that ideal archetypes exist intellectually within a given institutional sector; this stage involved the identification of archetypes for use as templates against which the organizational arrangements of a sample of organizations could be compared. In the second stage, we examined whether the organizational arrangements of the organizations corresponded to the templates. Table 1 summarizes the methods used in each stage.

Stage One: Identification of Archetypes, 1969–72

To establish an archetype requires two steps. First, the underlying interpretive schemes within an institutional sector have to be isolated. Second, the structural and processual implications of these interpretive schemes have to be uncovered. As we defined them, archetypes are what McKinney called a "constructed type," "a purposive, planned selection, abstraction,

TABLE 1
Research Strategy Summarized

Stage	Methods
1. 1969-72	
Identification of interpretive schemes within the institutional sector	● Documentary analysis of the sector ● Unstructured interviews, 200 respondents
1971-72	
Documentary analysis of population to produce sample of 24 organizations	● Structured questionnaire, 72 percent response from population of 422, and documentary analysis of specific organizations ● Analysis of academic research on local government
2. 1974-82	
Longitudinal examination of 24 organizations	● 752 semistructured interviews ● Documentary analysis ● Structured questionnaire with 100-percent response

combination, and (sometimes) accentuation of a set of criteria with empirical referents that serves as a basis for comparison of empirical cases" (1966: 3).

The archetypal templates hunted in the present research were distilled from the prescriptions operating within the intellectual milieu of a single institutional context. Sector specificity was taken as a given. Admittedly, having data from several sectors would have strengthened the findings reported in the second stage of the research; however, the difficulties involved in unearthing interpretive schemes, combined with the demands of a longitudinal methodology, provided a strong pragmatic justification for restricting attention to a single sector.

The particular institutional sector examined was municipal government in England and Wales. These organizations, called "local authorities," differ from their counterparts elsewhere because of their size—they employ up to 50,000 people—and functional complexity. The range of functions performed includes education, social welfare, highway construction, consumer protection, and recreational and cultural services. These are large, complex organizations.

The municipal sector was chosen as the research milieu because it met several criteria. First, the sector is well-defined and the organizations within it relatively homogeneous in terms of their legal status and the complexity of their responsibilities, thus ensuring that comparisons would be of like with like. Second, the organizations had discretion to organize as they wished, thus avoiding the problem of constraint by parent companies (cf. Child, 1973; Johnson, 1987). Third, the system of local government in England and Wales was recast on April 1, 1972, and each of the 422 organizations examined here had to produce reorganization plans (Dearlove, 1979) that were to

take effect in 1974. This process led to considerable debate, which raised awareness of underpinning ideas, making them amenable to recognition. Fourth, access was nonproblematical, an important consideration when research demands upon participating organizations are to be extensive for a lengthy period (Doz & Prahalad, 1988).

The search for archetype templates had three concurrent and iterative steps:

Context documentary analysis. Three researchers, including the present authors, carried out content analysis of reports and documents dating from the late 1950s to the late 1960s, pertaining to the organization and management of municipal authorities, and written by representatives of the British central government, local organizations, professional associations, and universities.¹ Each researcher identified statements and normative references that dealt with the appropriate domain of the municipality, how it should organize and manage itself, and performance expectations. Typical statements concerned such issues as failures to plan, the absence of clear goals and objectives, professional insularity, the lack of coordination between professions, and the need for new structures, such as a policy-planning process and a chief executive. The researchers met regularly and clarified the central themes of the documents.

Interviews and project groups. From 1969 to 1971, the researchers took advantage of residential ten-week executive development courses held at the University of Birmingham. We interviewed 200 senior managers from approximately 100 organizations using open-ended interviews. Table 2 summarizes the interview guide employed. The interviewees were from 30 to 45 years of age and had usually worked for at least three municipal organizations. They held senior managerial responsibilities and were regarded by their employers as upwardly mobile. The interviews lasted from one to three hours, were conducted in informal settings, such as after meals, and often involved more than one researcher and two (sometimes three) interviewees. These interviews, though informal, were an extremely rich source of data because they were conducted in an educational environment in which practicing managers were stimulated to reflect upon, and debate, ideas about organization and management in their institutional context in a manner not usually possible in one-on-one interviews in a work setting. Complementing the interview program were observations of discussions among managers in project groups of ten; the groups' formal task was designing an appropriate organization for a post-reorganization municipality, and the group discussions totaled 12–15 hours over three-week periods. We recorded and discussed the main themes and ideas of the discussions outside the groups. Each project group prepared written reports, which were presented orally to colleagues and the researchers, who retained them for future reference.

¹ Greenwood and Stewart (1974) and Stewart (1971) summarize some of this material.

TABLE 2
Interview Guide

Section	Illustrative Questions
Ideas and values	What do you see as the proper <i>role</i> of a municipal organization? What is its primary <i>purpose</i>? Is it changing? If so, what are the reasons and direction of change? How is the nature of your job changing, if at all? What are the purposes behind the change? How should it be changed? How might it change? What do you see as the important changes required of municipal organizational arrangements? What changes should the municipality be attempting? What are the key required changes? What are the key performance factors presently used in your organization? Are they changing?
Structures and systems	What are the main changes occurring in municipal structures and systems? What is the role of the chief executive officer and the management team? How do they differ from the town clerk and the chief officers' group? What is the reason behind the interest in corporate planning and how does it differ from more conventional budgeting processes?

Organizational document analysis. Prior to the reorganization of local governments, the population of 422 municipal organizations was requested to send copies of all reports and documents relating to organizational and policy-making arrangements that would be implemented after the reorganization; 304 organizations (72%) responded. The materials provided not only descriptions of organizational structures but rich narrative accounts explaining the organizations' purposes and their managers' ideas about and expectations of the way the organizations would operate. We content-analyzed the documents in terms of the emerging themes, the three researchers jointly reviewing each report.

The three-year program of documentary analysis and interviews, although somewhat messy at the outset, gradually converged on our elaboration of two sets of sectoral values, or interpretive schemes, and their respective implicated organizational arrangements. Throughout, we met frequently and discussed the growing collection of materials, comparing and examining them, often in an iterative fashion. By late 1970, two archetypes were reasonably salient in outline form: the heteronomous professional bureaucracy (Scott, 1965) and the corporate bureaucracy. The features of these archetypes are described below and summarized in Table 3. The archetypes were not articulated fully in the documentary sources in the coherent way set out in the table. The sources provided paper trails of incomplete ideas, cues, and expressions that required final intellectual assembly.

The archetypes were validated in two ways (Yin, 1984). First, we intro-

TABLE 3
Components of Two Organizational Archetypes

Components	Corporate Bureaucracy	Heteronomous Professional Bureaucracy
Interpretive scheme		
Domain	Community governance	Local administration
Principles of organizing	Centralized, corporate integration	Professional differentiation
Self-evaluative criteria	Analytical appraisal by interprofessional management	Professional practice defined by intraprofessional judgment
Organization design		
Structures		
Criteria of differentiation	Program or clientele	Professional groups
Ratio of integration to differentiation	High	Low
Human resource systems		
Criteria for reward distribution	Recruitment, career development, and rewards based on managerial and professional competence	Recruitment, career development, and rewards based on professional qualifications and experience
Type of control	Bureaucratic	Clan
Decision systems		
Rational analysis	Nonincremental, highly rational	Incremental, less rational
Interaction pattern	Based on corporate goals and cross-professional interaction and involvement	Based on professional involvement and judgment; no corporate accountability for goals
Assertiveness	Proactive stance toward policy making	Service administration, essentially reactive

duced them as intellectual constructs to 30 academics and chief executives who were prominent members of the local government community. Second, the ideas were presented in the residential executive development courses referred to above. The purpose was to verify that we had properly understood the interpretive schemes and their organizational implications and that the schemes were meaningful in the focal institutional sector. The level of agreement was extremely high concerning the overall existence of the two archetypes; there were almost no dissenters. The exact organizational implications were subject to somewhat more discussion, but a strong consensus emerged quickly.

Thus, validation was obtained, and the existence of two competing archetypes established.

The *heteronomous professional bureaucracy* archetype conceives organizations as administrative vehicles for the delivery of essentially disparate

services, such as education, social welfare, highway construction, housing, and police and fire protection. In this conception, the range of a municipal government's responsibilities is a consequence of historical accident rather than of policy intent, and the domain of the local authority is the sum of its responsibilities, each treated as a separate activity. The corporate bureaucracy archetype, in contrast, emphasizes the organization as an instrument of community governance. Within this conception, local services are strands of an integrated strategy for managing and influencing the organization's geographical community. The role of the organization is not administrative, implementing legally prescribed services, but governmental, combining packages of services and interventions in a strategic fashion.

These alternative beliefs about purpose and domain (community governance versus local administration) are connected to ideas about how the organization should evaluate its effectiveness in discharging its role. The corporate bureaucracy archetype emphasizes a high measure of analytical appraisal combined with rigorous assessment of programmatic (interservice) performance. Clear statements of purpose are to be made, targets established, and performance monitored. Attention focuses upon the reciprocal effects of services upon client or focal groups. Appraisal of performance is the responsibility of senior management. In the heteronomous professional bureaucracy archetype, on the other hand, professional autonomy and judgment are critical. There is no conception of general management. The primary performance criterion is professional competence within each service area, and good performance is the best practice as defined by professionals.

In other words, the structure of accountability in the corporate bureaucracy transcends professional jurisdictions and imposes analytical rigor and clarity of performance targets, but the heteronomous professional bureaucracy sets accountability within professional jurisdictions.

The two sets of values are each translated into structures and systems, thus constituting archetypes. Structurally, the heteronomous professional bureaucracy organizes services as separate, highly specialized units based on professional competencies. There is a low ratio of integration to differentiation, and the criterion of differentiation uses the profession as the basis of departmentation. Recruitment and career development systems emphasize the importance of professional qualification: only professionals can become department heads, and administrators are of low status. Compensation and appraisal systems focus upon performance of professional activities and, perhaps most important of all, the resource allocation mechanisms and the underpinning information system are arranged in terms of Wildavsky's (1984) incremental, nonanalytical model of budgeting, a model suited to the values of the professional bureaucracy (Greenwood, 1984).

The corporate bureaucracy has a different organizational framework. It emphasizes use of integrative devices, such as a chief executive officer, program directors, and central analytic capabilities imposed across service departments. Hence, there is a high ratio of integration to differentiation. Programs, not professions, are the basis of departmentation: departments are

organized on the basis of objectives and outputs. Recruitment emphasizes general management competence combined with professional experience. Incentive systems reward corporate rather than professional contributions. Career structures facilitate movements across professional boundaries, for instance, by employees' assignment to central agencies or through their membership in interdisciplinary project teams. Resource allocation mechanisms encompass programmatic as well as professional review. Allocations reflect corporate goals, subordinating professional to managerial judgment on the basis of analytical techniques (Skelcher, 1980).

Stage Two: Empirical Examination, 1972–82

In the second stage of the research, we examined whether the organizational arrangements of practicing organizations corresponded to the identified templates in the manner set out in the three hypotheses.

Sampling procedure. A sample of 24 organizations was drawn from the 304 organizations that provided documents. The documents outlined management structures to be put in place in the post-reorganization period. Decisions on planning and human resource systems were not to be made until after the reorganization had occurred. We used two measures of structure, the ratio of integration to differentiation and the use of program or professional-functional criteria of differentiation, to construct a two-by-two matrix, shown in Figure 1. One quadrant of Figure 1 describes the corporate bureaucracy (high ratio plus high use of program criteria), and another describes the heteronomous professional bureaucracy (low ratio plus high use of professional-functional criteria). We drew organizations from each quadrant, controlling for size by taking both large and small organizations from each quadrant (Hinings & Greenwood, 1988a).

Figure 1 also shows that 158 organizations were between archetypes at the beginning of the research period. There are two reasons for this occurrence. First, it is in the nature of archetypes, adaptation, and processes of organizational change that there will always be organizations that are not in a complete state of fit. They may be close to archetype status or some distance away ("embryonic" and "schizoid," Greenwood & Hinings, 1988). Second, in an institutional setting in which pressures for change are particularly strong, significant numbers of organizations are likely to be in non-archetypal situations. This was the case in the setting studied here.

The sample size of 24 balanced our desire for a reasonably large sample against our pragmatic ability to conduct detailed case studies of each organization over three periods, 1974–75, 1977–78, and 1981–82. Because our overriding concerns were to examine the extent to which the newer archetype, corporate bureaucracy, had actually been established and sustained and to understand the dynamics of change, we used a purposive sampling frame: 6 organizations each were drawn from cell b and cell d, 9 from cell c, and 3 from cell a. Hinings and Greenwood (1988a) contains further details.

Data collection. The primary method of data collection was a program of semistructured interviews with the chief executive and senior managers (the

FIGURE 1
Sampling Matrix

Criteria of Differentiation	Ratio of Integration to Differentiation	
	Low	High
Program	(a) Incoherent 107	(c) Coherent: corporate bureaucracy 117
Professional-functional	(b) Coherent: heterono- mous professional bureaucracy 29	(d) Incoherent 51

department heads) of each organization; at least six managers were interviewed per organization. A total of 752 interviews were conducted, each lasting approximately one and a half to two hours. Interviews concentrated on allowing respondents to explain their organization's purpose and tasks, how resources were allocated, how policies were set, and the interactions between departments. We conducted the interviews in 1974-75 and repeated them in 1977-78 and 1981-82. Surprisingly, there was virtually no turnover in the personnel interviewed, the likely explanation for that stability being that there had been many retirements and personnel changes in 1972.

Measurements. We obtained the ratio of integration to differentiation by calculating the number of lateral policy and budget committees in a municipal authority as a percentage of the number of separate departments it had. A high value indicated a high integrative effort. The measure of the criteria of differentiation was calculated as the absolute number of departments based upon a program rather than a functional-service basis. A functional-service organization would have departments such as engineering, planning, and architecture, whereas a program organization would have a department of technical services combining the previously separate units into team-based units. A high value indicates high use of the program criterion. The interaction pattern was measured as the extent to which certain policy and managerial issues were routed through interdepartmental structures. We identified seven issues: preparation of draft estimates, finalization of revenue estimates, preparation of the capital investment program, recruitment and promotion of senior managers, and three substantive policy issues relevant to each department analyzed; the pattern of accountability for each issue was then mapped. The distinction sought was whether issues were

routed through a management team with multiprofessional membership or handled exclusively within a given professional department. The range of possible ratings for each issue was from 0 to 3, with a high rating indicating a corporate pattern of interaction. Ratings were based upon the number of professions involved in discussing each issue. The organization's interaction score was the total for the seven issues.

The *degree of rational analysis* was measured as the extent to which an organization employed eight techniques, such as "position statements," "needs-gap analysis," and "output budgets," whose use constituted part of the wider debate on the applicability of corporate planning and budgeting to municipal authorities (cf. Skelcher, 1980). Organizations were rated on a three-point scale (yes = 3, partly = 2, and no = 1) for each technique. The higher the rating, the greater the use of rational analysis within a resource allocation system.

The *extent of assertiveness* was measured as the extent to which an organization had explicit procedures for three items: overall environmental scanning, an explicit meta-policymaking system covering the organization as a whole, and explicit environmental scanning procedures within each department. Organizations were rated on each item in terms of the same three-point scale described in the preceding paragraph.

The attempt to measure the *criteria of reward distribution* proved abortive. The organizations were governed by national terms and conditions of employment; as a result, we observed little variation in rewards. Similarly, attempts to identify the basis of recruitment for senior positions were unsuccessful because of the sensitivity of the issue within the organizations.

The *distinction between clan and bureaucratic forms of appraisal* was indexed as the extent to which a department head's policies and program were scrutinized using a common format of cross-organizational goals and priorities rather than professional goals relevant to a single department. We defined bureaucratic control as occurring when departmental policies and appraisals were subject to examination by corporate bodies such as management teams, corporate evaluation groups, and policy committees. Clan control was seen as occurring when departments were allowed to operate according to their own internal standards. Table 4 gives basic statistics and alpha coefficients for all measures.

We used the interviews to complete a narrative description of each organization studied, which was then validated in two ways (Yin, 1984). First, and of greater weight, documents, such as organizational charts, budgetary procedures and reports, policy statements, and appraisal reviews, were used to confirm the narrative. For example, we validated the routing of issues (the measure of interaction patterns) by examining a selection of committee reports and agendas to see which committees and task forces looked at specific reports. Similarly, whenever interviews led to the conclusion that an organization was using techniques of rational analysis, we requested copies of reports illustrating their utilization. We referred to documents not simply to confirm the veracity of the respondents, but also to compare and

classify organizations reliably. It is easier to compare organizations along dimensions like rationality when operational examples (the use of specific techniques) from different organizations can be directly examined and compared.

A second procedure used to validate the narrative account of each organization's structures and systems was to have a senior officer in the organization read it. We used this second validation procedure in approximately half of the sample. In every case, there was agreement with the account.

Organizational patterns. We computed standardized scores for each variable using a mean of 50 and a standard deviation of 15. Standardized scores were used to enable comparisons across variables and across time periods with regard to the extent to which organizations were in an archetype. An organization was classified as within the corporate bureaucracy archetype if it scored two-thirds of a standard deviation or more above the mean on each variable, achieving a score of 60 or more. It was classified as within the heteronomous professional bureaucracy archetype if it scored two-thirds of a standard deviation or more below the mean on each variable, achieving a score of 40 or less. We chose two-thirds of a standard deviation as the most appropriate cutoff point because a greater standard deviation would have resulted in a large middle range including most scores, and a lower standard deviation would have created a narrow middle range with most scores falling in the high or low extremes. An organization was classified as within an archetype if all its structures and systems were consistent with the theoretical template.

TABLE 4
Basic Statistics of Organizational Design Variables^a

Variables	Survey Points						Alphas
	Time 1		Time 2		Time 3		
	Means	s.d.	Means	s.d.	Means	s.d.	
Structures							
Criteria of differentiation	10.29	3.37	10.29	3.29	10.17	3.39	
Ratio of integration to differentiation	7.08	4.30	7.38	4.40	8.75	3.78	
Human resource systems							
Appraisal and control	11.04	3.11	14.58	1.72	11.92	3.34	.53
Decision systems							
Rational analysis	15.38	7.88	22.21	9.68	15.08	9.26	.80
Assertiveness	4.58	1.98	5.21	2.17	4.96	2.51	.93
Interaction pattern	11.13	2.17	11.75	2.01	11.92	3.35	.52

^a N = 24.

Importantly, the measurement of archetypes does not (and should not) involve measuring the commitment of individuals within organizations to an archetype—hence our emphasis on the use of interviews to produce descriptive accounts of organizational arrangements. Structures and systems reflect and embody ideas and values. To the extent that structures and systems consistently embody one set of ideas and values, an observer can talk of archetype coherence. But current organization members need not be committed to those ideas and values (Greenwood & Hinings, 1988). This distinction is important methodologically: The pattern of commitment within an organization to particular interpretive schemes and their organizational implications is a dynamic of change, not a definitional component of an archetype. The existence of an archetype is established not by measuring the ideas, beliefs, and values of organization members, but by comparing the empirically revealed pattern of the structures and systems of an organization to the analytical pattern of a previously identified ideal template.

RESULTS

Hypothesis 1

Table 5 summarizes the organizational arrangements of the 24 organizations at the three different survey points. In the first period, the organizations were significantly less likely to have archetypal status (only 33 percent did so) than in the two subsequent periods, when 42 and 71 percent, respectively, conformed to archetypes. These statistics neither clearly support nor disprove Hypothesis 1.

Importantly, however, cross-sectional data such as appear in Table 5 are not satisfactory alone because they miss broad patterns of intellectual movement occurring across the population of organizations. Results for any one year cannot indicate whether the survey point is typical or reflects a transitional and atypical state. And even three waves of statistics require interpretation. We can illustrate this point by recounting the institutional dynamics of the period in question.

At the beginning of the research inquiry, both design archetypes—or, more accurately, the ideas and values underpinning them—formed part of the institutional sector's currency and debate. The heteronomous professional bureaucracy had the longer history and was the predominant model

TABLE 5
Archetype Congruence at Three Survey Points

Survey Points	Congruence		Absence of Congruence	
	Number	Percentage	Number	Percentage
1974–75	8	33	16	67
1977–78	10	42	14	58
1981–82	17	71	7	29
Total	35	49	37	51

before 1967. During the early 1970s, a series of reports criticized the failure of local organizations to handle serious and growing problems, such as inner city decline, economic deterioration, and social and educational disadvantage. The structures and systems of these organizations, with their professional basis, were singled out as a major obstacle to more flexible and integrated responses. In addition, the worsening fiscal context, in which the central government coerced local organizations to cut expenditures, strengthened the intellectual and political position of those advocating the adoption of alternative organizational arrangements.

The pressure to adopt corporate structures and processes was thus considerable. Indeed, such was the growing legitimacy of the corporate model that a report prepared and endorsed by the central government extolled the values of corporate operations and produced charts depicting corporate structures; charts of systems were not offered, although there was discussion in the body of the report of new policy planning and human resource approaches. The important point is that the flux and ferment of ideas was unusually high in the early years of the research period and contributed to the relative instability of organizational archetypes in the period pictured in Table 5.

The results reported here are consistent with the complementary analytical thrusts of Tushman and Romanelli (1985) and Zucker (1983, 1987). Tushman and Romanelli suggested that organizations evolve through a series of lengthy stages of design convergence punctuated by dramatic and concentrated upheavals, or metamorphoses. Tushman and Romanelli's thesis is in terms of individual organizations rather than populations or classes of organizations, but Zucker's work indicates that new forms of organizational arrangements, once legitimated within an institutional sector, are rapidly adopted by most organizations within the sector, much in the way that strategic recipes (Child & Smith, 1987) spread throughout an industry. This scenario seems to be what occurred for the sample of organizations examined here. Prior to 1967, few of the organizations operated within the corporate bureaucracy archetype, and few had reviewed their overall designs systematically (Greenwood, Norton, & Stewart, 1969). However, by 1972 the corporate archetype had been articulated and legitimated as the appropriate model—hence the apparent instability reported in Table 5 and the movement toward the archetype. The appropriate conclusion to be drawn from the data shown in Table 5 is, therefore, that contextual factors were pushing organizations out of one set of coherent structures toward another. Such a conclusion leads to a further observation, which is that the extent to which adherence to archetypes is the normal organizational practice has to reflect the degree of turbulence or stability within the institutional context. The flux and ferment of ideas in the sector examined here was unusually high in the early stages of the research and contributed to the low proportion of coherently organized organizations in 1974–75. The later data, those gathered at the third survey point, support Hypothesis 1.

Hypothesis 2

If the proposition that organizations alter discordant structures to achieve archetypal status is valid, the 16 organizations that lacked design coherence at the beginning of the survey period should have been seen to move toward a state of coherence. The relevant data are summarized in Figure 2, which shows the tracks (Greenwood & Hinings, 1988), or historical paths, of the 24 organizations across the three survey points. A track is the temporal association of an organization with one or more archetype. It is about the extent to which an organization remains over time within the assumptions and parameters of a given archetype or moves between archetypes (Hinings & Greenwood, 1988a). Of the 16 organizations that initially lacked coherence, 9 (56%) attained it. Further, 11 (61%) organizations that lacked coherence at the first and second surveys moved in the predicted direction (tracks 2, 3, and 5 of Figure 2). Thus, results reasonably support the idea of organizations evolving from incoherence to coherence.

Hypothesis 3

Figure 2 can also be used to examine the extent of inertia. The degree of absolute inertia is low, in that only 6 organizations remained within the same archetype throughout the research period (track 1). A further 4 organizations exhibited relative inertia, beginning either within, or close to an archetype before moving into it, and staying within it over the subsequent survey periods (track 2 and, in the case of two organizations, track 3). Thus, a total of 10 organizations can be classified as exhibiting inertia. Of these, only 2 started as heteronomous professional bureaucracies and stayed there. The other 8 were all in or close to the corporate bureaucracy archetype, so their inertia was legitimate.

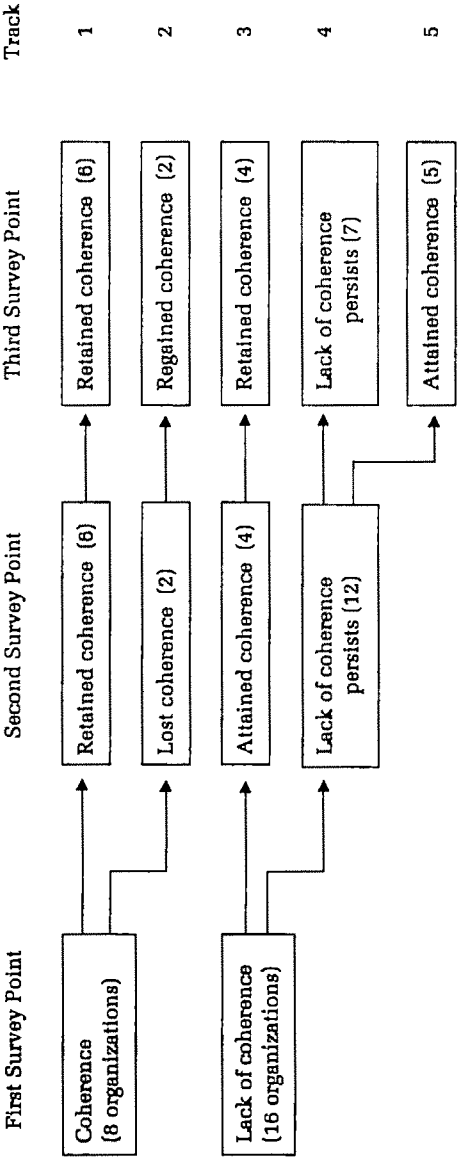
The degree of inertia shown by these 10 organizations can be contrasted with the small extent of movement between archetypes. Only 2 organizations reoriented from one archetype to another between 1974 and 1982. Given that we predicted that inertia would occur after archetype coherence was established, we can conclude that 10 of 12 eligible organizations (83%) exhibited inertia. (Of the remaining 12 organizations, 7 did not attain coherence, and 5 attained coherence only at the third survey point.) The 5 that attained coherence were all within the corporate bureaucracy archetype.

These figures indicate the existence of dynamics that hold in place a prevailing set of assumptions and design arrangements, once those arrangements are coherent. The strength of the dynamics and their influence may not be absolute, but they exist and work toward archetypal stability. Hypothesis 3 thus has some validity, although it should be borne in mind that the majority of organizations studied here practiced relative rather than absolute inertia.

DISCUSSION

The starting point for this study was the idea that organizational design arrangements can usefully be considered as wholes rather than as collections

FIGURE 2
Tracks of 24 Organizations, 1974-82^a



^a Visual inspection of the data revealed that size did not affect an organization's track. Organizations of varying sizes are found along each track.

of disparate elements and that underlying sets of ideas, beliefs, and values give these wholes pattern. A set of structures and systems congruent with an interpretive scheme constitutes an archetype.

The results presented are not clear-cut. We are reasonably satisfied that organizations do tend to operate with structures and systems that approximate archetypes (Hypothesis 1); however, the evidence is less than definitive because, we have suggested, of the flux of circumstances in the focal sector at the time of the research. There is also evidence that organizations tend to move toward archetype coherence (Hypothesis 2). And the data confirm Hypothesis 3, predicting that major organizational change, or passage between archetypes, is less common than is inertia—archetype stability.

These results are not to be thought of as disappointing because they are less than clear-cut. The process of uncovering and understanding them raises important issues and themes. Notably, the research highlights the importance of researchers' incorporating institutional and temporal contexts within their analytical frameworks. Furthermore, the importance of these contextual factors begets certain methodological considerations.

The Importance of Institutional Context

There is no doubt that organizations exist in a milieu of ideas about appropriate ways of succeeding and behaving in their task environments. Furthermore, greater and lesser networks facilitating the dissemination and promotion of specific recipes will characterize different institutional arenas (Hinings & Greenwood, 1988b; Whipp & Clark, 1986). At present, there is rather more evidence of how institutionally located frameworks of ideas and values influence not-for-profit organizations than similar evidence from the private sector; Zucker (1988), for instance, contains examples predominantly from the not-for-profit sector. But there are interesting examples in the private sector of how an organization's institutional environment shapes core values and provides prescriptions for appropriate patterns of organized activity (e.g., Baum & Oliver, 1991; Child & Smith, 1987; Greenwood, Hinings, & Brown, 1990; Pettigrew, 1985; Worthy, 1985).

In general, however, comparatively little is known of the archetypes used in different institutional arenas. The literature provides suggestions and clues, but a misleading concern for generic organizational types still dominates the field. Admitting the importance of underpinning purposive values specific to institutional sectors challenges the case for generic types. Our research, because of its setting in a single institutional environment, does not demonstrate that generic types do not exist. But we would recommend that greater effort go into recognizing and uncovering which archetypes are to be found in which institutional arenas, and why.

The Importance of Temporal Context

The study of organizational archetypes has to be firmly set in a temporal context. This does not simply mean the adoption of a longitudinal frame of

reference, although that is a clear methodological implication. Encompassing the temporal context is also a matter of appreciating the trends occurring at the time research is conducted. Thus, the present work indicated the strong prescription in favor of the corporate bureaucracy archetype, and we have been careful to interpret the degrees of inertia and change demonstrated in light of that trend. Researchers have to interpret organizations with knowledge of the degree to which the temporal context supports convergence or, alternatively, prescribed metamorphosis and of the strength and directional content of pressures for change affecting the population within a given institutional arena. Neither individual organizations nor populations of organizations can be studied as though they have no past or direction.

We further suggest that temporal context should have a biographical component (Kimberly, 1987). Understanding the degree and importance of change in an organization's arrangements and the extent to which those changes do or do not indicate a loosening or tightening of attachment to particular archetypes is difficult unless a researcher appreciates not only the broad sweep of prescriptive influences but also the historical position of the individual organization. For us, this meant understanding whether an organization was historically a professional or corporate bureaucracy. Elsewhere, it has meant understanding whether an organization has a history of inertia or of change, whether senior managers have been recruited from within or outside the organization, and whether performance has traditionally been perceived as deficient or strong (Hinings & Greenwood, 1988b). The point is that change cannot be examined without some attention to the biography of the organization under study.

Raising the importance of the biographical context is very close to explicitly raising the importance of understanding the dynamics of strategic change—the forces that shape and facilitate or hinder the degree and direction of an organization's temporal attachment to a particular archetype. The uncovering of archetypes is thus important but leads to a set of intriguing questions. What are the mechanisms by which archetypal recipes are developed and learned within an institutional setting? To what extent and how are archetypes disseminated across institutional boundaries? What factors encourage inertia and what are the dynamics of archetypal reorientation?

Various researchers are posing and addressing these questions. In earlier work (Greenwood & Hinings, 1988) we elaborated a language for classifying such movements between archetypes. Tushman and Romanelli (1985) and Miller (1991) have theorized about the pace and phasing of movements. In very different ways, Hannan and Freeman (1977), Carroll (1984), Tushman and Romanelli (1985), Pettigrew (1985), and another earlier work (Hinings & Greenwood, 1988a) have provided ideas about the dynamics of archetype change. Zucker (1987), Child and Smith (1987), Calori, Johnson, and Sarnin (1991), and Child (1988) have examined the role of institutional context in the dissemination of ideas and approaches. In other words, researchers have shown considerable interest in exploring the dynamics and processes of organizational attachment to, and decoupling from, available design arche-

types. As yet, however, no definitive set of answers has emerged, and inquiry promises to be competitively stimulating.

We have suggested (Hinings & Greenwood, 1988a) that the dynamics of stability and change can best be understood through a framework dealing with the interaction of situational context, interpretive schemes, interests, dependencies of power, and organizational capability. Stability will result when there is a fit between these elements and a particular organizational archetype, and change will result when contradictions, incompatibilities, and tensions occur between them. We also distinguished between "precipitating" and "enabling" dynamics. For example, value commitments and interests, which are situational factors, can precipitate change or enhance stability; power and capability enable change or, again, reinforce stability.

Defining an archetype in terms of structures and systems underpinned by values and ideas (interpretive schemes), as we have done, directs attention to a key potential dynamic of change, namely, the extent to which current organizational actors are committed to prevailing and alternative interpretive schemes. Four possible patterns of commitment can be envisaged: (1) widespread commitment to an existing interpretive scheme (a status quo commitment), (2) widespread commitment to an alternative interpretive scheme (a reformative commitment), (3) substantial commitment to two or more interpretive schemes (a competitive commitment), and (4) low commitment to prevailing and alternative interpretive schemes (an indifferent commitment).

In the case of a status quo commitment, pressure toward organizational inertia will be strong. Reformative commitments are liable to lead to inter-archetype movement. Competitive commitments destabilize organizational arrangements without necessarily activating complete reorientations, producing archetype incoherence. Indifferent commitments can be associated with inertia but are amenable to externally induced change.

The central point is that understanding the key link between patterns of structures and systems and the underlying interpretive scheme provides a researcher with three things essential for theorizing about change. First, archetypes provide a definitional basis that allows classification of the scale of change; for instance, change can be defined as incremental or quantum. Second, archetypes offer an understanding of the consistency or inconsistency of the direction of change as it occurs. Third, a critical dynamic of change and inertia is identified, namely, the pattern of commitment to the interpretive scheme embodied in an organization's structures and systems.

Methodological Implications

The language of analysis in this article—inertia, momentum, evolution, reorientation, tracks—is about motion and change. The study of archetypes is thus the study of organizations over time. Interestingly, although the research period reported upon here was considerably longer than that usually found in organization theory research, we have concluded that the period was too short because it was difficult to control the effects of broad institu-

tional developments. A fourth wave of data collection would have allowed us to arrive at stronger conclusions about all three hypotheses.

A second methodological lesson to be derived from the present research is that an understanding of organizational structures and systems and of organizational change requires a serious effort to systematically uncover the ideas, beliefs, and values of organization members and the ideas and values contained within the focal institutional and temporal contexts. Organizational patterns are not disembodied attributes of organizations but reflectors of meanings. Therefore, archetypes can be uncovered only through a process of research in which researchers seek to assimilate the intellectual milieus of the temporal and institutional contexts of the organizations they wish to understand. The signal implication of defining archetypes in terms of values and ideas and of acknowledging the possibility of those values and ideas having institutional specificity is that the process of intellectual assimilation (understanding the form and implication of ideas and values) is possible only through a variant of the grounded approach deployed here. The archetypes discussed were not theoretical constructs applied to the institutional population but constructs derived from the population itself. It was, moreover, striking to us that the interpretation of the more quantitatively based analysis of the second stage of the research was possible only by virtue of the lengthy (three-year) process of a grounded approach tolerated in stage one.

One difficulty that could be encountered in research of the kind described here and be exacerbated as a research time frame lengthens is the emergence during the research effort of unanticipated archetypes. The longer the period of research, the greater the chance that another phase of intellectual ferment and upheaval will occur. Thus, in the institutional setting of the present study, toward the end of the project ideas about privatization and total quality were being discussed and subsequently would affect definitions of domain, modes of organization, and appropriate criteria of performance in the institutional sector of interest here. The study of organizational change as the movement within and between archetypes, which promises to be theoretically rewarding, may well also be methodologically challenging and frustrating, and it may require some creativity.

Conclusions

The purpose of the present study was threefold: first, to examine the concept of archetype in order to provide a satisfactory definition; second, to assess the concept's empirical relevance; and third, to review some of the theoretical and methodological issues involved in the study of archetypes. The definition provided stresses the need to adopt a holistic approach to the study of organizational arrangements and to recognize interpretive schemes as providing the basis of pattern. The findings give reasonable support to the ideas that archetypes exist as intellectual constructs within institutional sectors and that organizations tend to seek to organize their structures and systems in terms of those archetypes. Certainly, there is sufficient encouragement from the data to warrant further exploration and utilization of ar-

chetypes as a focus of theoretical and research effort. These modest purposes, we stressed at the outset, are within the traditions of the long and important search within organization theory for typologies and taxonomies, a search integral to, if sometimes implicit in, much contemporary work.

In addressing the third purpose—to uncover relevant theoretical and methodological issues—we have raised important issues for subsequent research efforts aimed toward understanding organizational change. In particular, we have argued for inclusion of the institutional and temporal contexts and for the adoption of methodologies more sensitive to the institutional specificity of meanings and the purpose at the core of the archetype concept. Our methodological recommendations imply a style of research demanding in terms of resources and the commitment of time, but we believe that the theoretical potential outweighs the methodological price.

REFERENCES

- Abernathy, W. J., & Clark, K. B. 1985. Innovation: Mapping the winds of creative destruction. *Research Policy*, 14: 3–22.
- Andrews, K. R. 1980. *The concept of corporate strategy*. Homewood, IL: Irwin.
- Astley, W. G. 1985. The two ecologies: Population and community perspectives on organizational evolution. *Administrative Science Quarterly*, 30: 224–241.
- Barley, S. R. 1986. Technology as an occasion for structuring: Evidence from observations of CT scanners and the social order of radiology departments. *Administrative Science Quarterly*, 31: 78–108.
- Bartunek, J. M. 1984. Changing interpretive schemes and organizational restructuring: The example of a religious order. *Administrative Science Quarterly*, 29: 355–372.
- Baum, J., & Oliver, C. 1991. Institutional linkages and organizational mortality. *Administrative Science Quarterly*, 36: 187–218.
- Bennis, W. G., Benne, K. D., & Chin, R. 1985. *The planning of change*. New York: Holt, Rinehart & Winston.
- Betton, J., & Dass, G. 1985. The application of population ecology models to the study of organizations. *Academy of Management Review*, 10: 750–757.
- Beyer, J. 1981. Ideologies, values, and decision making in organizations. In P. C. Nystrom & W. H. Starbuck (Eds.), *Handbook of organizational design, vol. 2: Remodeling organizations and their environments*: 166–202. New York: Oxford University Press.
- Blau, J., & McKinley, W. 1979. Ideas, complexity and innovation. *Administrative Science Quarterly*, 24: 200–219.
- Blau, P. M., & Schoenherr, R. A. 1971. *The structure of organizations*. New York: Basic Books.
- Callon, M., & Vignolle, J. P. 1976. Organisation locale et enjeux societaux. *Sociologie du travail*, 3(2): 233–255.
- Calori, R., Johnson, G., & Sarnin, P. 1991. French and British top managers' understanding of the structure and the dynamics of their industries: A cognitive analysis and comparison. *British Journal of Management*, 3: 61–78.
- Carroll, G. R. 1984. Organizational ecology. In R. H. Turner & J. F. Short (Eds.), *Annual review of sociology*, vol. 10: 71–93. Palo Alto, CA: Annual Reviews.
- Champion, D. J. 1975. *The sociology of organizations*. New York: McGraw-Hill.

- Child, J. 1973. Predicting and understanding organization structure. *Administrative Science Quarterly*, 18: 168–185.
- Child, J. 1988. On organizations in their sectors. *Organization Studies*, 9: 13–19.
- Child, J., & Smith, C. 1987. The context and processes of organizational transformation. *Journal of Management Studies*, 24: 565–593.
- Clegg, S. 1975. *Power, rule and domination*. London: Routledge & Kegan Paul.
- Cummings, L. L. 1984. Compensation, culture, and motivation: A systems perspective. *Organizational Dynamics*, 12(1): 33–44.
- Daft, R., & Macintosh, N. 1984. The nature and use of formal control systems for management control and strategy implementation. *Journal of Management*, 10(1): 43–66.
- Dearlove, J. 1979. *The reorganization of British local government*. Cambridge: Cambridge University Press.
- DiMaggio, P., & Powell, W. 1983. The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48: 147–160.
- Doz, Y., & Prahalad, V. 1988. A process model of strategic redirection in large, complex firms. In A. Pettigrew (Ed.), *The management of strategic change*: 63–83. Oxford: Basil Blackwell.
- Dyer, L. 1983. Bringing human resources into the strategy formulation process. *Human Resource Management*, 22: 257–272.
- Galbraith, J. 1975. *Organizational design*. Reading, MA: Addison-Wesley.
- Greenwood, R. 1984. Incremental budgeting: Antecedents of change. *Journal of Public Policy*, 4: 277–306.
- Greenwood, R., & Hinings, C. R. 1988. Design archetypes, tracks and the dynamics of strategic change. *Organization Studies*, 9: 293–316.
- Greenwood, R., Hinings, C. R., & Brown, J. 1990. The P2-form of strategic management: Corporate practices in the professional partnership. *Academy of Management Journal*, 33: 725–755.
- Greenwood, R., Norton, A. L., & Stewart, J. D. 1969. Recent changes in the internal organization of county boroughs: Part 1: committees. *Public Administration*, Summer: 151–167.
- Greenwood, R., & Stewart, J. D. 1974. *Corporate planning in English local government: An analysis with readings 1967–72*. London: Charles Knight.
- Hannan, M., & Freeman, J. 1977. The population ecology of organizations. *American Journal of Sociology*, 85: 929–966.
- Hinings, C. R., & Greenwood, R. 1988a. *The dynamics of strategic change*. Oxford: Basil Blackwell.
- Hinings, C. R., & Greenwood, R. 1988b. The normative prescription of organizations. In L. Zucker (Ed.), *Institutional patterns and organizations*: 53–70. Cambridge, MA: Ballinger.
- Huff, A. S. 1982. Industrial influences on strategy reformation. *Strategic Management Journal*, 3: 119–131.
- Johnson, G. 1987. *Strategic change and the management process*. Oxford: Basil Blackwell.
- Karpik, L. 1978. Organizations, institutions and history. In L. Karpik (Ed.), *Organization and environment: Theory, issues and reality*: 15–68. Beverly Hills, CA: Sage.
- Khandwalla, P. N. 1977. *The design of organizations*. New York: Harcourt Brace Jovanovich.
- Kikulis, L., Slack, T., & Hinings, C. R. 1992. Institutionally specific design archetypes: A framework for understanding change in national sport organizations. *International Review for the Sociology of Sport*, 27: 343–370.

- Kilmann, R., Saxton, M., & Serpa, R. (Eds.). 1985. *Gaining control of the corporate culture*. San Francisco: Jossey-Bass.
- Kimberly, J. R. 1987. The study of organization: Toward a biographical perspective. In J. W. Lorsch (Ed.), *Handbook of organizational behavior*: 223–237. Englewood Cliffs, NJ: Prentice-Hall.
- Kimberly, J. R., & Quinn, R. E. (Eds.). 1984. *Managing organizational transitions*. Homewood, IL: Irwin.
- Lammers, C. 1978. The comparative sociology of organizations. In R. H. Turner, J. Coleman, & R. C. Fox (Eds.), *Annual review of sociology*, vol. 4: 485–510. Palo Alto, CA: Annual Reviews.
- Lawrence, P., & Lorsch, J. G. 1967. *Organization and environment*. Cambridge, MA: Harvard University Press.
- Lindblom, C. 1958. The science of “muddling through.” *Public Administration Review*, 29: 79–88.
- McKelvey, W. 1975. Guidelines for the empirical classification of organizations. *Administrative Science Quarterly*, 20: 509–525.
- McKelvey, W. 1982. *Organizational systematics: Taxonomy, evolution, classification*. Berkeley: University of California Press.
- McKinney, J. C. 1986. *Constructive typology and social theory*. New York: Appleton-Century-Crofts.
- Meyer, J., & Rowan, B. 1977. Institutional organizations: Formal structure as myth and ceremony. *American Journal of Sociology*, 83: 440–463.
- Miles, R., & Snow, C. 1978. *Organizational strategy, structure and process*. New York: McGraw-Hill.
- Miller, D. 1981. Towards a new contingency approach: The search for organizational gestalts. *Journal of Management Studies*, 18: 1–26.
- Miller, D. 1987. Strategy making and structure: Analysis and implications for performance. *Academy of Management Journal*, 30: 7–32.
- Miller, D. 1991. *The Icarus paradox*. New York: Harper Collins.
- Miller, D., & Friesen, P. 1980. Momentum and revolution in organization adaptation. *Academy of Management Journal*, 23: 591–614.
- Miller, D., & Friesen, P. 1984. *Organizations: A quantum view*. Englewood Cliffs, NJ: Prentice-Hall.
- Mintzberg, H. 1979. *The structure of organizations*. Englewood Cliffs, NJ: Prentice-Hall.
- Mintzberg, H. 1983. *Structure in fives: Designing effective organizations*. Englewood Cliffs, NJ: Prentice-Hall.
- Nadler, D. A. 1987. The effective management of organizational change. In J. W. Lorsch (Ed.), *Handbook of organizational behavior*: 358–369. Englewood Cliffs, NJ: Prentice-Hall.
- Nadler, D. A., & Tushman, M. 1989. Organizational frame bending: Principles for managing reorientation. *Academy of Management Executive*, 1: 194–204.
- Oliver, C. 1991. Strategic responses to institutional processes. *Academy of Management Review*, 16: 145–179.
- Ouchi, W. 1977. The relationship between organizational structure and organizational control. *Administrative Science Quarterly*, 22: 95–113.
- Perrow, C. 1982. *Complex organizations: A critical analysis*. Glenview, IL: Scott, Foresman.

- Pettigrew, A. 1973. *The politics of organizational decision making*. London: Tavistock.
- Pettigrew, A. 1985. *The awakening giant*. Oxford: Basil Blackwell.
- Pfeffer, J. 1981. *Power in organizations*. Boston: Pitman.
- Pinder, C. C., & Moore, L. R. 1979. The resurrection of taxonomy to aid the development of middle-range theories of organizational behavior. *Administrative Science Quarterly*, 24: 99-118.
- Porter, M. E. 1980. *Competitive strategy*. New York: Free Press.
- Pugh, D. S., Hickson, D. J., & Hinings, C. R. 1969. An empirical taxonomy of work organizations. *Administrative Science Quarterly*, 14: 115-126.
- Quinn, J. B. 1982. *Strategies for change: Logical incrementalism*. New York: Irwin.
- Ranson, S., Hinings, C. R., & Greenwood, R. 1980. The structuring of organizational structures. *Administrative Science Quarterly*, 25: 1-17.
- Sathe, V. 1985. *Culture and related corporate realities*. Homewood, IL: Irwin.
- Schein, E. 1986. *Organizational culture and leadership*. San Francisco: Jossey-Bass.
- Schuler, R. S. 1984. *Personnel and human resource management* (2d ed.). St. Paul: West.
- Scott, W. R. 1965. Reactions to supervision in a heteronomous professional organization. *Administrative Science Quarterly*, 10: 65-81.
- Scott, W. R. 1987. The adolescence of institutional theory. *Administrative Science Quarterly*, 32: 493-511.
- Singh, J. V., House, R. J., & Tucker, D. J. 1986. Organizational change and organizational mortality. *Administrative Science Quarterly*, 31: 587-611.
- Skelcher, C. 1980. From programme budgeting to policy analysis. *Public Administration*, 59: 155-172.
- Sponder, J. C. 1980. *Strategy making in business*. Unpublished doctoral dissertation, School of Business, University of Manchester.
- Stewart, J. D. 1971. *Management in local government: A viewpoint*. London: Charles Knight.
- Stonich, P. J. 1984. The performance measurement and reward system: Critical to strategic management. *Organization Dynamics*, 12(1): 45-57.
- Thompson, K. 1975. Religious organizations. In J. B. McKinlay (Ed.), *People processing*: 1-40. New York: Holt, Rinehart.
- Tolbert, P. S., & Zucker, L. G. 1983. Institutional sources of change in the formal structure of organization: The diffusion of civil service reform, 1880-1935. *Administrative Science Quarterly*, 28: 22-39.
- Tushman, M. L., & Anderson, P. 1988. Technological discontinuities and organization environments. In A. Pettigrew (Ed.), *The management of strategic change*: chap. 3. Oxford: Basil Blackwell.
- Tushman, M. L., & Romanelli, E. 1985. Organizational evolution: A metamorphosis model of convergence and reorientation. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, vol. 7: 171-222. Greenwich, CT: JAI Press.
- Van de Ven, A., & Drazin, R. 1985. The concept of fit in contingency theory. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, vol. 7: 333-365. Greenwich, CT: JAI Press.
- Walsh, K., Hinings, C. R., Greenwood, R., & Ranson, S. 1981. Power and advantage in organizations. *Organization Studies*, 2: 131-152.
- Weber, M. 1947. *The theory of social and economic organization*. New York: Free Press.

- Whipp, R., & Clark, P. 1986. *Innovation and the auto industry*. London: Frances Pinter.
- Wildavsky, A. 1984. *The politics of the budgetary process*. Boston: Little, Brown.
- Worthy, J. 1985. *Shaping an American institution: Robert E. Wood and Sears Roebuck*. Urbana: University of Illinois Press.
- Yin, R. K. 1984. *Case study research: Design and methods*. Beverly Hills, CA: Sage.
- Zucker, L. 1983. Organizations as institutions. In S. B. Bacharach (Ed.), *Research in the sociology of organizations*, vol. 2: 1–47. Greenwich: JAI Press.
- Zucker, L. 1987. Normal change or risky business: Institutional effects of the “hazard” of change in hospital organizations, 1959–1979. *Journal of Management Studies*, 24: 671–700.
- Zucker, L. (Ed.). 1988. *Institutional patterns and organizations*. Chicago: Ballinger.

Royston Greenwood is the AGT Professor in the Department of Organizational Analysis, Faculty of Business, at the University of Alberta. He received his Ph.D. degree from the University of Birmingham, England. His current research concerns the management of professional service organizations, strategic organizational change, and the institutional specificity of design archetypes.

C. R. Hinings is the Thornton A. Graham Professor of Business in the Department of Organizational Analysis, University of Alberta. His research interests are the management and dynamics of strategic organizational change, with particular reference to professional service firms.

RESEARCH NOTES

© Academy of Management Journal
1993, Vol. 36, No. 5, 1082-1096.

TOWARD AN ORGANIZATIONAL BEHAVIOR OF CONTRACT LABORERS: THEIR PSYCHOLOGICAL INVOLVEMENT AND EFFECTS ON EMPLOYEE CO-WORKERS

JONE L. PEARCE
University of California, Irvine

This study investigated differences in the psychological involvement and task assignments of labor-contractor and employee engineers and the effects of the contractors on the attitudes of their employee co-workers. Findings partly supported the hypothesis that supervisors shift interdependent tasks to employees when contractors are present in their work groups. However, employees were not found to have greater quasi-moral involvement than contractors. In addition, the presence of contractor co-workers was associated with employee reports of lower organizational trustworthiness, as expected.

For several important reasons, a better understanding is needed of the organizational psychology of contractors and how contracted labor affects employee co-workers. First, contractors are a growing presence in many organizations (Osterman, 1988; Pfeffer & Baron, 1988), taking many forms: agency nurses work in hospitals, job shop engineers bring special technical expertise to design teams, consultants provide a variety of services, and clerical temps are ubiquitous in many organizations. Businesses retain such workers for a fixed project or time period (although many contracts are renewed) and pay them by the job or hourly, providing no fringe benefits because the workers are not employees. Contract workers are known by various labels, but here they will be called "labor contractors."

Second, theorists of comparative institutions—here defined as organizational theorists and institutional economists concerned with the question of employment relations as an alternative to labor contracting—have developed theories of the effects of different kinds of contracts on workers' ex-

Special thanks to Alan Morris, who assisted in data analysis; to Gregory Stephens, Steven Sommer, and Carol Sexton, who assisted in data collection; and to Richard Brahm, Marcia Frideger, Carol Sexton, Anne Tsui, and the anonymous reviewers for this journal, all of whom provided valuable comments on earlier drafts.

pectations and psychological attachments, but these ideas have not been tested empirically. For example, Williamson (1975: 38) suggested that a factor in the decision to hire employees rather than retain contractors is that employees tend to have greater quasi-moral involvement, or greater commitment and a stronger sense of moral obligation to the organization, than contractors, whose involvement tends to be more calculated. Neither Williamson nor subsequent theorists have defined quasi-moral involvement precisely, nor have they tested Williamson's assumption (e.g., Ouchi, 1980; Williamson, 1985, 1991). They reflect, however, a widespread presumption that the organizational psychology of employees and contractors should be different. Here, I developed an operational definition of quasi-moral involvement and tested the assumption about such involvement.

Finally, if contractors are becoming more common in workplaces, scholars and practitioners need to know more about their effects on their employee co-workers. Therefore, I developed and tested a hypothesis about the effects of the presence of contractors on the employees working alongside them.

HYPOTHESES

Markets Versus Hierarchies

Theorists of comparative institutions have long wondered why employment relations exist as an alternative to labor contracting (Coase, 1937), referred to as the markets versus hierarchies debate. A situation in which contract laborers work in an organization alongside employees and under the same forms of supervision is an interesting "hybrid model" (Williamson, 1991) that allows two ideas drawn from these research streams to be tested: whether employee or contractor status itself affects the psychological involvement of workers, and whether certain features of task assignments are associated with a given status.

Quasi-moral involvement. Although theorists of comparative institutions have not focused on worker psychology, many have written that the employment relationship leads to greater quasi-moral involvement than does the contractor relationship. Drawing on Williamson's (1975) work, I defined quasi-moral involvement as consisting of two concepts that have received substantial theoretical and empirical attention in research on organizational behavior: extrarole behavior and organizational commitment. Workers with strong quasi-moral involvement are likely to engage in more extrarole behaviors, or citizenship acts (Organ, 1988). Extrarole behaviors are worker actions not mandated by an organization but intended to assist it. Examples include helping co-workers learn new procedures, taking the initiative in problem solving, and pitching in to meet deadlines (Katz & Kahn 1978; Pearce & Gregersen, 1991). If an employment contract does, indeed, lead to greater quasi-moral involvement, there should be differences between contractors and employees in the extent to which they engage in such behaviors:

Hypothesis 1: Employees will engage in more cooperative and extrarole acts than will contractors.

Quasi-moral involvement also implies a psychological commitment to an organization. There are many reasons why employees would be expected to have greater organizational commitment than contract laborers. Edwards (1979), Abegglen and Stalk (1985), and Osterman (1988) have suggested that a long-term employment relationship will lead workers to identify with their organization. When both parties depend on the long-term success of the organization, commonality of interests is fostered. Although these ideas have intuitive appeal, researchers who have studied employee organizational commitment know that employees' organizational attachments can vary widely (e.g., Mowday, Steers, & Porter, 1982). Pfeffer and Baron also questioned whether status as an employee or contractor per se would influence organizational commitment. More proximal features of a worker's situation, such as characteristics of the job itself (e.g., Mottaz, 1988), treatment by a supervisor (e.g., Bateman & Strasser, 1984), and recruitment and socialization practices (Caldwell, Chatman, & O'Reilly, 1990), have been shown to affect employee organizational commitment. However, tenure has shown a strong association with organizational commitment in numerous studies, supporting the intuitive assumption that employees' expectation of lengthy tenure will lead them to have greater organizational commitment than contractors.

Hypothesis 2: Employees will have greater commitment to a work organization than will contractors.

Task assignments. Comparative institutions theorists have devoted substantial attention to positing the kind of work or task assignments most appropriate to employment and to labor contracting. They have suggested that employment relations are more efficient than labor contracting when tasks require knowledge that is particular to an organization, when monitoring worker performance is difficult, and when work is repetitive (Ouchi, 1980; Williamson, 1975, 1985). Nevertheless, labor contractors have increasingly become substitutes for employees. Although the growth of information technology may have changed the nature of some workers' tasks in ways that make labor contractors more appropriate (Eisenhardt, 1989), sometimes businesses bring labor contractors into employment settings for nontask reasons. Pfeffer and Baron (1988) suggested that executives may attempt to reduce labor costs by limiting a company's number of employees, but they may leave managers free to hire contractors to complete work. They also noted that in many jurisdictions, labor legislation protects employees more comprehensively than it does contractors, so organizations may seek flexibility and lower costs by substituting labor contractors for employees. Further, Osterman (1988) argued that competitive pressures increasingly force organizations to adopt a "core-periphery model" in which part of the labor force is made peripheral by the use of temporaries.

These scholars present convincing evidence that legal, institutional, and external competitive pressures exist that favor increased use of contract

labor, whether or not the tasks involved are most efficiently performed by contract laborers. If these nontask pressures are powerful enough and if the comparative institutions theorists are correct in their identification of the task characteristics suitable for employment, we might expect organizations to attempt to reallocate task assignments to make some tasks more suitable for contractors. For example, managers might assign to contractors work that needs little or no organization-specific knowledge, has easily monitored output, or is nonrecurrent. In some circumstances, employee co-workers would find their job responsibilities shifted to accommodate the contractors. As an illustration, a clerical temp might work at the desk of a low-ranking employee secretary who is filling the post of the chief executive officer's secretary, who is on vacation.

Thus, if the comparative institutions theorists are correct, having labor contractors brought into an organization to work alongside employee co-workers for nontask reasons should lead supervisors to reassign work to their employees in order to craft jobs better suited to the more limited involvement of labor contractors. That is, the presence of labor contractors in employment settings could have significant implications for the task assignments of the remaining employees.

One feature of this possible task reassignment might be a shifting to employees of work that requires high interdependence, so that more independent jobs can be assigned to contractors. It is more difficult to monitor the individual contribution and output of workers on interdependent tasks, and such tasks often involve greater responsibility and organization-specific knowledge. Such an arrangement would make it easier for supervisors to monitor contractor performance and would decrease the organization's dependence on limited-tenure workers. Therefore, we might expect that employees who work alongside contractors would be assigned a larger proportion of the interdependent work than would employees who work only with other employees.

Hypothesis 3: Employees in work units with contractor co-workers will have greater task interdependence than will their peers working in employee-only work units.

Trust in the Organization

The presence of contractor co-workers can be expected to affect employees. Here, one such effect is proposed and tested: reduction of employee trust in an organization. There is evidence that employees tend to select co-workers, rather than outsiders, as referents for equity comparisons (e.g., Oldham, Kulik, Stepina, & Ambrose, 1986). Therefore, it is possible that employees might choose contractors who are comparable to themselves as salient referents, and differences in the employees' and contractors' compensation contracts might lead employees to question the fairness of their own organization.

First, many contractors receive greater cash (current) compensation, but employees receive greater fringe benefits and job security. Fair compensa-

tion for employees depends on an organization's future willingness and ability to deliver on its tacit obligations. The presence of contractor co-workers receiving more cash underscores for employees that they have chosen a form of compensation that makes them more dependent. Further, the presence of contractors reminds employees that they are in a market, rather than a familial, relationship with the organization, and market actors are expected to exploit their opportunities, not take care of one another. Thus, contractors remind employees that their receiving full compensation depends on the organization's ability and willingness to refrain from aggressively exploiting their dependence. Finally, the presence of contractors may also suggest that the organization is willing to take advantage of workers whenever possible. Even if employees prefer their own position to working as contractors, they may come to empathize with their contractor co-workers and perceive that the organization is exploiting them by not offering them health, unemployment, and retirement benefits. This perception may lead employees to question the organization's fairness to the contractors today—and possibly to themselves tomorrow.

In summary, employee and contractor co-workers are paid differently for similar work, and this difference could signal many different things to employees. Whether employees perceive themselves or the contractors as having the better deal, it is expected that they will see the organization as less trustworthy than it would appear in the absence of contractors.

Hypothesis 4: Employees with contractor co-workers will report less trust in their organizations than will employees in employee-only work units.

METHODS

Setting and Respondents

The setting for the research was a large aerospace company that designed and manufactured sophisticated equipment for air and space craft. Its primary customers were major commercial aircraft manufacturers, who accounted for about 40 percent of sales at the time of data collection, and federal contractors and subcontractors, about 60 percent of sales. The aerospace industry is highly cyclical. The company has always used contractors to absorb industry fluctuations or to work in highly specialized areas. Contractors were perceived as normal in this setting; they represented an alternative career path that all employees reported considering and some employees had tried. Contractors in aerospace engineering receive higher cash compensation than employees; in this setting, hourly means were \$27.16 for contractors versus \$19.26 for employees ($p < .01$), and employees were well aware of this difference. However, the contractors had less job security and often had to move to various geographical locations to remain working throughout the year. Some of the company's work units had several contractors working alongside employees, and other work units had only employees. Finally, in this setting, the contractors were very visible, because all

individuals had to wear identifying badges, and the contractors' badges were a different color than the employees' badges.

Data were collected from July to September 1988 in three company divisions located in southern California. I asked all engineers and engineering technicians in the three divisions to complete questionnaires in group settings. The questionnaires had identifying codes to allow me and an assistant to match responses with data from the personnel files (contractor or employee status, age, tenure, pay level). From 284 potential respondents, 223 usable surveys were returned, representing an 84 percent response rate for employees and a 50 percent response rate for contractors; nonrespondents did not differ from respondents on available occupational or demographic data. Thirty-three supervisors (one was unavailable) were asked to complete surveys asking for their evaluations of employees and contractors on five performance dimensions. Usable supervisor questionnaires were returned from 25 individuals (a 76 percent response rate), producing performance ratings that could be assigned to 126 of the responding employees and contractors.

Measures

Type of worker variables. From company records, engineers and engineering technicians were categorized as either employees (coded 0) or contractors (coded 1). The usable data set contained 199 employees and 24 contractors. In this group, 45 percent of the contractors were from employment agencies, and 55 percent were self-referrals. They had an average tenure of 17 months in the organization. Employees were further categorized as to whether or not they worked in a work unit with contractors, which was determined as follows: all contractors were assigned to work units headed by supervisors. An employee whose supervisor had at least one contractor reporting to him or her was categorized as having contractor co-workers (coded 1); 14 work units included contractors. Employees of a supervisor to whom only employees reported were categorized as belonging to employee-only work units (20 units). This measure best represents the extent to which employees had comparable contractor co-workers in this functional organization in which work-unit members were grouped together with their supervisors. Of the 199 employees, 34 could not be identified with a work unit, leaving 50 employees categorized as working alongside comparable contractors and 115 employees categorized as working in employee-only work units.

Task interdependence. I used three scales measuring task interdependence taken from Pearce, Sommer, Morris, and Frideger (1992), who completed a comprehensive psychometric analysis in a longitudinal sample of four organizations. The first scale is called task dependence on others; it had six items, for example, "My own performance is dependent on receiving accurate information from others." The second is others' dependence, a three-item scale (e.g., "In my job I am frequently called on to provide information and advice"). The third is reciprocal interdependence, a four-item

scale (e.g., "My job involves working closely with others in producing a team effort"). In these data, the items loaded on the same three scales in a rotated varimax procedure as they did in the original Pearce and colleagues' work. Table 1 reports means, standard deviations, interitem reliabilities, and correlations.

Supervisors' evaluations. Supervisors were asked to rate their subordinate employees and contractors on cooperativeness: "Please rate the following individuals on the extent to which they are cooperative: that is, the extent to which they are responsive to you and to coworkers' needs. Please do not rank them in comparison to one another, but rate them individually on their willingness to be team players." This supervisor assessment complemented the self-reports of extrarole behavior described below and allowed one of the hypotheses to be tested with measures from two different sources.

Self-report attitudes. Organizational commitment was assessed with the short form of Mowday, Steers, and Porter's (1979) Organizational Commitment Questionnaire. Pearce and colleagues (1992) reported on scale development and on reliability and validity statistics for measures of extrarole behavior, a three-item scale (e.g., "I take advantage of opportunities to do more than is required"), and organizational trustworthiness, an eight-item scale (e.g., "In general, this organization's personnel policies seem to reflect a distrust of employees," reverse-scored).

Analyses

Pearce and colleagues (1992) sought to validate the scales used here by examining both discriminant and construct validity. Discriminant validity was established through a confirmatory factor analysis of the scales, with all the goodness-of-fit indexes indicating strong support. Construct validity was assessed by examining the patterns of correlations predicted for four organizations with different corporate cultures. In addition, another study using the organizational trustworthiness scale found that, as predicted, employees in three state-owned work organizations in Hungary in 1990 reported lower organizational trustworthiness than employees in privately owned Hungarian and American companies (Pearce, Branyiczki, & Bakacsi, in press).

Although both supervisor-rated cooperativeness and self-reported extrarole behavior were expected to reflect facets of citizenship behavior, there was no relationship between ratings on the two variables in this study ($r = .07$, *n.s.*). However, these measures were intended to tap two facets of a complex concept; Organ and Konovsky (1989) and O'Reilly and Chatman (1986), among others, have reported different facets of citizenship behavior.

Because the assignment of contractors to work units could not be experimentally controlled, there was always the possibility that some non-tested feature of the different environments in which employees with and without contractor co-workers worked might have accounted for possible differences. To provide some additional controls, I held constant demographic variables that could be expected to be associated with the dependent variables in light of previous research. These included respondent age, or-

TABLE 1
Means, Standard Deviations, and Correlations^a

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9
1. Type of worker											
2. Employee with contractor co-worker											
3. Dependence on others	3.61	.60	-.10	.25**	(.75)						
4. Others' dependence	3.83	.68	-.06	.16*	.22**	(.63)					
5. Reciprocal interdependence	3.72	.62	-.03	.10	.34**	.39**	(.62)				
6. Supervisor-rated cooperativeness	4.14	.71	-.10	-.14	.07	.15*	.15*				
7. Extrarole behavior	3.19	.73	.22**	.04	-.08	.32**	.22**	.07	(.63)		
8. Organizational commitment	3.37	.67	.05	-.06	.05	.23	.30	.14	.36**	(.90)	
9. Organizational trustworthiness	3.21	.65	.08	-.21**	.03	-.00	.09	.28**	.06	.61**	(.65)

^a Statistics in parentheses are alpha coefficients.

* $p < .05$

** $p < .01$

ganizational tenure, and pay level. Tests of the hypotheses were conducted by a hierarchical regression procedure in which the demographic variables were entered in the first step and the hypothesized variable was entered in the second step.

RESULTS

Markets Versus Hierarchies

Quasi-moral involvement. Hypothesis 1 predicts that employees will engage in more citizenship behavior, as reflected in extrarole and cooperative acts, than will contractors. The results reported in Table 2 do not support this hypothesis. Interestingly, contractors reported themselves as engaging in significantly more extrarole behaviors than did employees. Hypothesis 2 states that employees will have greater organizational commitment than would contractors. There was no significant difference in the organizational commitment of employees and contractors, as seen by the engineers and technicians themselves. Thus, these data provide no evidence that employee quasi-moral involvement is greater than labor contractors' involvement, according to the workers themselves and their supervisors.

Task assignments. Hypothesis 3 predicts that employees in work units with contractor co-workers will report greater task interdependence than will their peers working in employee-only work units. As can be seen in Table 3, results supported the hypothesis for one of the three measures of task interdependence and marginally support it for a second. Employees in work units with contractor co-workers reported significantly more dependence on others and marginally more dependence of others on them than employees working in employee-only work units. Reciprocal interdependence was not significantly different for employees in the two types of work units. Overall, the data provide weak support for the expectation that an organization will shift interdependent tasks to the employee co-workers of contractors to reduce its dependence on the contractors.

Trust in the Organization

Hypothesis 4 predicts that employees with comparable contractor co-workers will report lower trust in their organization than will employees in employee-only work units. Findings supported this hypothesis (see Table 3). This result is consistent with the argument that the presence of contractors will lead their employee co-workers to question the fairness of their organization.

DISCUSSION

Consistent with theories of comparative institutions, there was evidence that the company accommodated contractors by shifting interdependent tasks to their employee co-workers. However, there was no support for the assumption, grounded in literature on comparative institutions, that employees have a greater quasi-moral involvement with work organizations

TABLE 2
Results of Hierarchical Regression Analyses for Quasi-Moral Involvement

Variables	Supervisor-rated Cooperativeness			Self-reported Extrarole Behavior			Organizational Commitment		
	Equation 1 <i>b</i>	s.e.	Equation 2 <i>b</i>	s.e.	Equation 1 <i>b</i>	s.e.	Equation 2 <i>b</i>	s.e.	Equation 2 <i>b</i>
Constant	4.11**	.27	4.01**	.28	2.81**	.24	2.97**	.24	2.96**
Age	-.00	.01	-.00	.01	.01	.01	.01	.01	.01
Tenure	.00	.00	.00	.00	-.00	.00	-.00	.00	-.00
Pay level	.01	.01	.02	.02	.00	.01	.01	.01	.01
Type of worker			-.33	.26			.52*	.23	-.02
R ²	.01		.02		.04		.07		.03
F	.22		.56		1.86		2.75*		1.29
df	3,111		4,110		3,146		4,145		3,146
ΔR ²			.01				.03		4,145
ΔF			1.58				5.26*		.00

* $p < .05$ ** $p < .01$

TABLE 3
Results of Hierarchical Regression Analyses for the Presence of Contractors

Variables	Dependence on Others			Others' Dependence			Reciprocal Interdependence			Organizational Trustworthiness		
	Equation 1		Equation 2		Equation 1		Equation 2		Equation 1		Equation 2	
	b	s.e.	b	s.e.	b	s.e.	b	s.e.	b	s.e.	b	s.e.
Constant	3.64**	.20	3.53**	.20	3.37**	.23	3.30**	.23	3.69**	.21	2.69**	.21
Age	-.01*	.01	-.01*	.00	.00	.01	.00	.00	.01	.01	.01**	.01
Tenure	.00	.00	.00	.00	-.00†	.00	.00	.00	.00	.00	-.00*	-.00
Pay level	.02	.01	.02†	.01	.02	.01	.02	.01	-.01	.01	.01	.01
Employee with contractor												
co-worker			.34**	.11			.23†	.12	.12	.11	-.29**	.17
R ²	.04		.10		.05		.08		.02		.10	.14
F	1.75		3.93**		2.45†		2.75*		.83		4.77**	5.36**
df	3,137		4,136		3,137		4,136		3,137		3,137	4,136
ΔR ²			.07				.02				.04	.04
ΔF			10.13**				3.50†				1.17	6.56**

† p < .10

* p < .05

** p < .01

than their contractor co-workers. In addition, employees with contractor co-workers reported less trust in their organization than did those in employee-only work units, as hypothesized.

Regarding the shifting of interdependent tasks to employees in mixed employee-contractor work units, supervisors said in interviews that they tried, in fact, to give simpler jobs to contractors when they could. One told the story of how he had been "burned" by contractors in the past. His unit completed original design work that was passed on to the unit that designed the manufacturing processes, and often problems would develop later, in the design or manufacturing stage. The engineers who had worked on the original drawings would be sent to work on the task forces set up to solve the problems. However, the contractors were usually gone by the time these problems surfaced. The first time this happened, this supervisor took the problem to his own supervisor and asked what he should do. His supervisor replied that it was "his problem" and that he should know the drawings well enough to solve it himself. This supervisor now knows that anything on which a contractor works may come back to him personally, so he needs to supervise contractors' work more closely than employees'; thus, he tries to give them assignments that make his monitoring easier (Eisenhardt, 1989). Although the additional burdens contractors placed on supervisors have not been discussed in the relevant literature, these burdens are consistent with existing theories of comparative institutions, since it is the immediate supervisors who solve the problems contractors may create. If Pfeffer and Baron (1988) and Osterman (1988) are correct in their judgments that contractors are becoming increasingly prevalent within organizations, research on the neglected area of contractor supervision would be an important area for scholarly attention.

Results in this study were not consistent with the comparative institutions theorists' assumptions that employees should report greater quasi-moral involvement than contractors. There was no evidence that employees reported greater extrarole behavior or organizational commitment than contractors, nor did their supervisors see employees as more cooperative than contractors. Although it is possible that the nonsignificance of the present findings is the result of the small number of contractors studied, it suggests an argument countering the previous assumptions about workplace psychology.

There probably has been too great a distinction drawn between the organization and marketplace as settings for emotional involvement. There is ample evidence that markets are settings for emotional involvement, for example, traders develop personal attachments to other traders that lead them to be slow in responding to price changes (e.g., Baker, 1984). Further, research on organizational commitment and citizenship behavior suggests that organizational membership alone does not lead to involvement, but that proximal causes are important. In settings such as the one studied here, contractors joined a team and faced social pressures to conform to collegial normative expectations, whether or not such actions were explicitly part of

their contracts. In fact, in our interviews, the contractors reported experiencing a conflict between immediate social pressures to be good team members and their contracts, which called for limited involvement. Since contractors did not want to face social ostracism at work, they tended to adopt the behaviors of good team members. Thus, their own self-reports that they engaged in more extrarole behaviors than employees (Table 2) seem to reflect normative pressures in their work units. Alternatively, the higher reports of contractor extrarole behavior may stem from the open-ended quality of the contracts of employees, who may assume that many behaviors are job requirements rather than extrarole actions (Stinchcomb, 1986). Theorists of comparative institutions have focused on the control of opportunism (self-seeking with guile) (Eisenhardt, 1989; Perrow, 1986; Williamson, 1975, 1985). However, the present results suggest that the opportunism of contractors and employees may be muted more by proximal interpersonal processes than by the nature of compensation contracts. Researchers know very little about how workplace normative expectations become established (Nadler, Hackman, & Lawler, 1979), yet those interested in how opportunism in the workplace is managed may find this a fruitful line of inquiry.

There was support for the hypothesis that the presence of contractors was associated with less employee trust in the organization. This is a potentially important finding. Previous research indicates that distrust and perceptions of unfairness lead employees to reduce their levels of performance (Organ, 1988; Walster, Berscheid, & Walster, 1976) and to be more likely to leave the organization (Porter & Steers, 1973). Gambetta (1988) found that distrust led to reduced cooperation, and Rotter (1980) found that those who distrusted were more likely to lie, cheat, and steal. If future research supports this preliminary finding, it would indeed be a reason for concern. Since the use of contract labor in organizations appears to be increasing, these results suggest that their effects on organizational climate and working relationships need more research attention.

Four major limitations to this research merit discussion. First, this study reported cross-sectional tests of causal hypotheses. Therefore, an important alternative hypothesis cannot be eliminated: some influence other than the one hypothesized may have actually caused the results. There did not appear to be meaningful differences in the tasks of the different work units; however, this alternative hypothesis cannot be ruled out empirically. Second, it is possible that the differences between employees with and those without contractor co-workers did not result from differences in the hypothesized social comparison processes but from some other signal associated with the use of contractors. Third, the respondents used in this research may have influenced the results. The roles of contractors in organizations, and therefore the psychological effects of their presence, vary a great deal; I chose the present setting because contractors had been a normal and noticeable part of the workplace for decades, and working as a contractor was a viable alternative career for the organization's employees. Thus, it would be imprudent to assume that these results generalize to settings in which contrac-

tors play a very different role. A fourth limitation is that the number of contractors responding was very small, leading to tests of low power, and therefore nonsignificant results should not be overinterpreted. In other words, the results reported here are limited and suggestive rather than definitive.

REFERENCES

- Abegglen, J. C., & Stalk, G., Jr. 1985. *Kaisha: The Japanese corporation*. New York: Basic Books.
- Baker, W. E. 1984. The social structure of a national securities market. *American Journal of Sociology*, 89: 775-811.
- Bateman, T. S., & Strasser, S. 1984. A longitudinal analysis of the antecedents of organizational commitment. *Academy of Management Journal*, 27: 95-112.
- Caldwell, D. F., Chatman, J. A., & O'Reilly, C. A. 1990. Building organizational commitment: A multi-firm study. *Journal of Occupational Psychology*, 63: 245-262.
- Coase, R. H. 1937. The nature of the firm. *Economica New Series*, 4: 386-405.
- Edwards, R. 1979. *Contested terrain: The transformation of the workplace in the twentieth century*. New York: Basic Books.
- Eisenhardt, K. 1989. Agency theory: An assessment and review. *Academy of Management Review*, 14: 57-74.
- Gambetta, D. 1988. Mafia: The price of distrust. In D. Gambetta (Ed.), *Trust*: 158-210. New York: Basil Blackwell.
- Katz, D., & Kahn, R. L. 1978. *The social psychology of organizations* (2d ed.). New York: Wiley.
- Mottaz, C. J. 1988. Determinants of organizational commitment. *Human Relations*, 41: 467-482.
- Mowday, R. T., Steers, R. M., & Porter, L. W. 1979. The measurement of organizational commitment. *Journal of Vocational Behavior*, 14: 224-247.
- Mowday, R. T., Steers, R. M., & Porter, L. W. 1982. *Employee-organization linkages: The psychology of commitment, absenteeism, and turnover*. New York: Academic Press.
- Nadler, D. A., Hackman, J. R., & Lawler, E. E. 1979. *Managing organizational behavior*. Boston: Little, Brown.
- Oldham, G. R., Kulik, C. T., Stepina, L. P., & Ambrose, M. L. 1986. Relations between situational factors and the comparative referents used by employees. *Academy of Management Journal*, 29: 599-608.
- O'Reilly, C. A. III, & Chatman, J. A. 1986. Organizational commitment and prosocial attachment: The effects of compliance, identification and internalization on prosocial behavior. *Journal of Applied Psychology*, 71: 492-549.
- Organ, D. 1988. *Organizational citizenship behavior: The good soldier syndrome*. Lexington, MA: Lexington Books.
- Organ, D. W., & Konovsky, M. 1989. Cognitive versus affective determinants of organizational citizenship behavior. *Journal of Applied Psychology*, 74: 157-164.
- Osterman, P. 1988. *Employment futures: Reorganization, dislocation, and public policy*. Oxford: Oxford University Press.
- Ouchi, W. G. 1980. Markets, bureaucracies, and clans. *Administrative Science Quarterly*, 25: 129-141.
- Pearce, J. L., Branyiczki, I., & Bakacsi, G. In press. Person-based reward systems: A theory of

organizational reward practices in reform-communist organizations. *Journal of Organizational Behavior*.

- Pearce, J. L., & Gregersen, H. B. 1991. Task interdependence and extrarole behavior: A test of the mediating effects of felt responsibility. *Journal of Applied Psychology*, 76: 838-844.
- Pearce, J. L., Sommer, S. M., Morris, A., & Fridger, M. 1992. *A configurational approach to interpersonal relations: Profiles of workplace social relations and task interdependence*. Working paper OB92015, Graduate School of Management, University of California, Irvine.
- Perrow, C. 1986. *Complex organizations*. New York: Random House.
- Pfeffer, J., & Baron, J. N. 1988. Taking the workers back out: Recent trends in the structuring of employment. *Research in Organizational Behavior*, 10: 257-303.
- Porter, L. W., & Steers, R. M. 1973. Organizational work and personal factors in employee turnover and absenteeism. *Psychological Bulletin*, 80: 151-176.
- Rotter, J. B. 1980. Interpersonal trust, trustworthiness, and gullibility. *American Psychologist*, 35: 1-7.
- Stinchcomb, A. L. 1986. *Organizational theory and project management*. Oslo: Norwegian University Press.
- Walster, E., Berscheid, E., & Walster, G. W. 1976. New directions in equity research. In L. Berkowitz & E. Walster (Ed.), *Advances in experimental social psychology*, vol. 9: 1-42. New York: Academic Press.
- Williamson, O. E. 1975. *Markets and hierarchies*. New York: Free Press.
- Williamson, O. E. 1985. *The economic institutions of capitalism*. New York: Free Press.
- Williamson, O. E. 1991. Comparative economic organization: The analysis of discrete structural alternatives. *Administrative Science Quarterly*, 36: 269-296.

Jane L. Pearce (Ph.D., Yale University) is a professor in the Graduate School of Management at the University of California, Irvine. She studies the effects of alternative organizational policies and structural forms on members' performance and interpersonal relationships.

VALIDITY OF AN HONESTY TEST IN PREDICTING THEFT AMONG CONVENIENCE STORE EMPLOYEES

H. JOHN BERNARDIN
DONNA K. COOKE
Florida Atlantic University

A 1990 review of the research on the validity of integrity-honesty tests performed by the U.S. Congress's Office of Technology Assessment found no studies conducted by independent researchers in which detected theft was used as the criterion. In the first such study, we found that scores on an honesty test successfully predicted detected theft for a group of convenience store employees. No significant differences on the test emerged as a function of race, gender, or age.

Employee theft is a widespread problem for American industry. Estimates of the extent of annual losses to such theft range from \$6 to \$200 billion (Murphy, 1993). One approach that companies have for attacking the problem of employee theft is preemployment screening. Screening includes polygraph testing and use of paper-and-pencil measures. The validity of polygraph testing is controversial, and since the passage of the federal Employee Polygraph Protection Act in 1988, use of polygraphs has been prohibited for most employers. Proscription of polygraphs is part of the reason for an annual estimated growth rate of 20 percent for the honesty-integrity test business (Deutsch, 1990). The Office of Technology Assessment (OTA), the analytical arm of the U.S. Congress, estimates that between five and six thousand businesses use these tests for personnel selection and, according to an American Psychological Association task force report, perhaps as many as 5 million people are tested annually (American Psychological Association, 1991). Integrity-honesty tests have come under increasing scrutiny. The OTA submitted its findings to Congress, which was considering legislation restricting or outlawing the use of such tests. Two states, Massachusetts and Rhode Island, have outlawed the use of such tests as the sole criterion for personnel decisions, and other states have considered such legislation. Most of the criticism centers on the tests' validity.

Various integrity tests purport to measure different constructs, among them antisocial tendencies and honesty. One would think that social desirability pressure would suppress responses, yet there is considerable variability in the test scores. Why individuals would knowingly present themselves as sympathetic to theft is not well understood but is perhaps related to their thinking that those attitudes are normal and not unsavory (American

Psychological Association, 1991; Murphy, 1993). In his review of the literature on honesty-integrity testing, Murphy subsumed an honesty construct within the domain of integrity, but he argued that an honesty measure is typically purported to predict employee theft in particular. We have adopted this distinction, using "honesty" instead of "integrity" in subsequent discussion.

Research has shown that the job applicants most likely to engage in theft-related activity perceive themselves as average people in a basically dishonest world (London House Press, 1987; Murphy, 1993). The typical instrument used for prediction is designed to detect attitudes toward honesty, especially attitudes that reflect the belief that dishonest behavior is normal, not criminal (London House Press, 1987). According to one popular theory, by projecting their own dishonesty, dishonest people can rationalize that everyone steals, so they are acting according to accepted norms (Joy, 1986; Murphy, 1993). Attitudes predicting theft fall into five general areas: (1) thinking about stealing more often than other people, (2) being more tolerant and less punitive toward those who steal than other people, (3) believing that most people commit theft regularly, (4) believing in interthief loyalty, and (5) accepting rationalizations for theft such as "My pay is too low" and "I am taking less than most" (London House Press, 1987).

RESEARCH BACKGROUND

The weaknesses of the validation research for honesty tests have been well-documented (American Psychological Association, 1991; Inwald, 1990; Logan, Koettel, & Moore, 1986; Sackett, Burris, & Callahan, 1989). After reviewing the empirical literature, the OTA issued the following statement: "The research on integrity tests has not yet produced data that clearly supports or dismisses the assertion that these tests can predict dishonest behavior" (1990: 8). The OTA also reported that "most research on integrity tests has been conducted by investigators working for integrity test publishers, and has not been replicated by independent researchers. Situations such as these, with stakeholders controlling performance and dissemination of research, necessarily raise caution flags" (1990: 8).

In addition to its lack of independence, another major weakness of the research on honesty tests is that few of the predictive validity studies have used detected theft as the criterion and instead have relied on either self-report admissions or polygraph performance criteria. The OTA investigation located only five predictive validity studies involving theft as the criterion, and every one was conducted by the publisher of the test examined. Detected theft typically is not used as the criterion in empirical validation studies because theft is so difficult to detect. In order to have enough cases of detected theft, either the overall samples need to be very large or the theft detection systems need to be very effective. Neither condition has prevailed in studies in which theft was used as the criterion: three of the studies reviewed by the OTA involved a grand total of 44 detected thieves out of

1,341 employees. Since it is highly likely that the detection rate is lower than the actual rate, a safe assumption in view of the self-report data, the correlations between test scores and detected theft are attenuated by the low variance in the theft measure (Sackett et al., 1989).

Another problem with the very limited number of empirical validity studies using theft as the criterion is that none of the publisher's studies provide assurances that criterion contamination did not affect the results. No statement is made in any of the studies clearly establishing that the people who detected employee theft and took action against the employees were unaware of the test scores of the individuals being observed. In fact, some integrity test manuals encourage managers to take test scores into consideration when observing the employees ultimately hired. To the extent that this recommendation is followed, researchers' faith in the true predictive validity of an honesty test instrument should be highly tenuous.

The purpose of this study was to address the two major criticisms of honesty test research. We conducted the research as independent researchers with no vested interest in the results and used a predictive validity design involving one of the most frequently used honesty tests, with detected theft as the criterion. In addition, our design precluded criterion contamination as an alternative explanation for results. We studied the predictive validity of the honesty subscale of tests developed and marketed by London House, Inc. of Park Ridge, Illinois.

METHODS

Sample

Data for this study were provided on 111 employees hired by a major retail convenience store chain between 1987 and 1989 to work at the counters of convenience store or gas station outlets. These employees included 55 men and 56 women; 74 were white, 34 were black, and 3 were Hispanic. This particular retail chain reported a serious problem with store "shrinkage," which was estimated to be 3 percent of sales. Internal theft was thought to be one of the major causes of this shrinkage. To combat this problem, the company installed a number of preventative and detection methods in 1986, including paper-and-pencil preemployment testing and an elaborate employee surveillance system that included videotape, computer data, and undercover operatives. For the years 1987 through early 1988, all applicants completed the Personnel Selection Inventory, Form 3 (PSI; London House Press, 1980a, 1980b). For the second half of 1988 and 1989, all applicants completed the Station Employee Application Inventory (SEAI; London House Press, 1986). The company provided us with data for all employees ($N = 54$) who were hired to work in a retail outlet for a district in Florida between 1987 and 1989 and were subsequently terminated for theft. Termination for theft could be based on any of the following behaviors: (1) mishandling cash or merchandise, (2) taking merchandise home without permission, and (3) cash register shortages. All 54 employees were formally

terminated for theft as defined by the company for these three categories of behavior. None of the employees appealed this reason for termination.

Test data were also provided for 57 other employees who were selected because they matched the theft group on important characteristics. Members of the matched group were hired during the same time period to work in the same stores for the same average number of hours per week, under the same supervision and the identical theft detection program. None of these employees had been terminated for theft or any other reason. The purpose of this matching process was to control for all major opportunity bias variables—variables related to work that may affect the opportunity to steal. After matching on variables related to opportunity bias, we then attempted to match groups on gender, race, and age. The order of priority for matching work conditions and worker characteristics was as follows: (1) time of hire (month, year), (2) store assignment, (3) major store supervisor or supervisors, (4) work shift (day, night, or both), (5) average number of hours worked per week, (6) gender, (7) age, and (8) race. We chose this order of variables on the basis of previous research on theft and criterion-related validation. Opportunity to steal was the most important variable to control in this study in order to provide for a fair test of the validity of the instrument. Analysis of these matching characteristics revealed the following results: There were no significant differences between the two groups based on the month and year of hiring ($p > .20$); there was a 100-percent overlap in store assignment and a 98-percent overlap of supervisors; there were no significant differences between the groups as a function of shift ($p > .20$); and there were no significant differences between the groups in hours worked per week up to the point of action leading to termination ($p > .20$).

After we had matched the characteristics of the nonterminated group to those of the terminated group on those variables, perfect matches on the remaining variables were not only difficult to make but also would have undermined the extent to which we could generalize our results, since research has determined that there are relevant gender differences—men are caught stealing more often and admit to more thefts—and age differences: older workers are less likely to steal. Research has not found race to be related to theft (e.g., Murphy, 1993).

Criterion variance was enhanced with these data through the matching process and should have resulted in a higher validity coefficient than would characterize a study in which the nonterminated group consisted of all 671 employees who took the test and were not terminated for theft. Of course, employees may have committed theft that was not detected. In fact, the rate of theft detection in this study approximates the rates of theft admission in several employee surveys (Food Marketing Institute, 1992; Zemke, 1990). Among the individuals Zemke studied, 43 percent of grocery workers reported some form of cash or property theft (1990: 78). A 1992 study by the Food Marketing Institute found that 45 percent of employees admitted to cash or property theft. The average employee admitted to stealing \$168 per

year but also estimated that the "average co-worker" stole \$1,040 per year (Food Marketing Institute, 1992).

We estimated the true validity of the test in the prediction of detected theft for all applicants selected during this time period by creating a data set approximating the total number of persons hired and a 7-percent rate of detected theft.

Instruments

The Personnel Selection Inventory, Form 3 (PSI) was developed in 1975 by London House to identify job applicants likely to exhibit counterproductive behaviors on the job. The 108-item questionnaire, of which there are ten versions, is given to job applicants with no time limit for completion. The PSI honesty subscale, which is common to and identical for all versions of the test, was specifically designed to measure employment applicants' attitudes toward theft and to predict on-the-job theft. According to materials provided by the publisher, over 3,500 employers have used some form of the PSI (London House Press, 1987).

A person scoring high on the honesty subscale generally ruminates over theft activities (a sample item is "How often in recent years have you simply thought about taking money without actually doing it?"), (2) projects theft in others (e.g., "How many executives steal from their companies?"), (3) rationalizes theft (e.g., "Will everyone steal if conditions are right?"), (4) has less punitive attitudes toward thieves than others (e.g., "A young person was caught stealing \$50 in cash from an employer. If you were his employer what would you do?"), and (5) has high interthief loyalty (e.g., "If you were caught stealing would you tell on the people who helped you?") (Terris & Jones, 1982).

The split-half reliability of the honesty subscale of the PSI is .95 (Terris & Jones, 1982). Joy (1986) reported significance at .05 or better on 40 of 60 validity studies involving the PSI, 8 of which used external criteria ranging from supervisor ratings of counterproductive behavior to detected theft and termination. Only 4 of those studies, all conducted by London House (Joy, 1986), used detected theft as the validation criterion; a meta-analysis of research on employee theft prevention by McDaniel and Jones (1988) included those studies.

The PSI uses norm-referenced cutoff scores based on base rate estimates of employee theft (Slora, 1989). London House researchers derived the base rates from their work on employee theft and production deviance behavior. Base rates reported by Jones and Joy (1988) ranged from 12 to 62 percent for theft and 65 to 84 percent for production deviance. Although London House suggests the use of its standard norms for specific occupations, it also offers company-specific cutoff scores for situations demanding flexibility, such as when standard cutoff scores are not appropriate for certain labor market conditions (Slora, 1989). In this research, we used the standard norms for convenience-retail store employees.

London House developed the Station Employment Applicant Inventory (SEAI) in 1986 as a selection test battery for entry-level gasoline station employees (Orban, 1986). The 168-item SEAI is administered with no time limit for completion. The honesty subscale on the SEAI is identical to the honesty subscales of all PSI instruments. Scores on all subscales are combined to form an overall employability index (Orban, 1986). We established norms for the population of applicants for convenience store jobs and used them to derive standard scores for the applicants who completed the SEAI in this study. According to London House, the use of tailored norms should result in higher validity for the SEAI than for the PSI for this particular employment setting.

Procedures

Applicants for employment in one organizational district of the participating company completed either the PSI or the SEAI at the district personnel department. The test scores and criterion data (later termination for theft) were provided by the personnel department at the broader regional level of the company. Company representatives assured us that scores on the two tests, including those on the honesty subscale, were not available to any supervisors or managers who participated in any way in personnel decisions after applicants were hired.

Decisions to hire or not hire applicants were based on their composite scores on the PSI or the SEAI, which were derived from the weighted subscale scores. The honesty subscale score was included in the derivation of this composite. Thus, there is direct range restriction in the analysis because the honesty subscale score is one component of the composite score used for decision making. However, neither the composite scores, the cutoff score used for selection, nor the correlation between the composite scores and the honesty subscale scores was made available to us to enable us to make corrections for range restriction in the obtained correlations. Thus, the obtained validity coefficient may be an underestimate of true validity because of the direct range restriction. We were able to correct our obtained validity coefficient for range restriction by using the variance estimate for all similar test takers, which we derived from the test manual for convenience store applicants that accompanied the PSI and the SEAI (London House Press, 1986).

RESULTS

For all 111 employees, the mean age was 30.59, with a standard deviation of 9.80. The overall mean standard score on the PSI honesty subscale was 62.54, with a standard deviation of 18.97. The overall mean standard score on the SEAI honesty subscale was 65.44, with a standard deviation of 15.65. There were no significant differences in honesty scores as a function of the instrument completed. Table 1 reports the descriptive statistics broken

TABLE 1
Comparison of Employee Groups

Variables	Total	Terminated for Theft	Not Terminated for Theft
Race			
White	74	38	36
Black	34	16	18
Hispanic	3	0	3
Gender			
Men	55	32	23
Women	56	22	34
Age			
Mean	30.59	29.11	31.98
s.d.	9.80	9.19	10.23
PSI honesty subscale			
Mean	62.54	58.32	68.22
s.d.	18.97	16.54	20.85
SEAI honesty subscale			
Mean	65.44	60.17	69.00
s.d.	15.65	12.61	16.65

down for the groups of terminated and not-terminated employees. Higher scores on the honesty subscale reflect greater honesty and thus, a lower likelihood of theft.

There were no significant differences between the proportions of whites and blacks who were terminated for theft (51 and 47%, respectively). Since there were only three Hispanics in the data, comparisons involving this group would be meaningless. Although 58 percent of the men were terminated for theft and 39 percent of the women were, results of the chi-square test were again not significant ($p > .05$). There were no age differences between those who were terminated for theft and those who were not ($p > .05$).

Table 2 reports the test scores on the honesty subscales of the PSI and the SEAI by race and gender. There were no significant differences between whites and blacks on either the PSI or the SEAI honesty subscale. Similarly, there were no significant differences between men and women on either the PSI or the SEAI. To test for age differences, we used categories from the Age Discrimination in Employment Act. There were no differences in subscale scores as a function of a job applicant's age category ($p > .05$).

The predictive validities of the PSI and the SEAI were determined by correlating scores on the two scales with termination for theft (1 = terminated, 2 = not terminated). The predictive validities of the PSI and the SEAI were .26 and .28, respectively ($p < .05$). Since the PSI and the SEAI honesty subscales are identical, the data were also collapsed for one analysis. The correlation between termination for theft and the collapsed honesty subscale data was .28 ($p < .01$).

We also estimated the true validity of the test in the prediction of de-

TABLE 2
Honesty Subscale Scores

Variables	Personnel Selection Inventory			Station Employment Applicant Inventory		
	N	Means	s.d.	N	Means	s.d.
Race ^a						
White	37	61.76	20.38	37	66.81	16.22
Black	17	64.23	15.90	17	62.29	12.13
Gender						
Men	29	63.31	16.66	26	65.96	16.16
Women	25	61.64	21.66	31	65.00	15.46
Age in years						
Under 40	51	62.29	19.42	42	63.50	14.68
40 and over	3	66.67	9.02	15	70.87	17.49

^a There were only three Hispanics in the group studied, so this category was excluded from further analyses.

tected theft without maximizing the variance by creating a representative data set with the true variance for detected theft and approximately the same number of observations as people hired during this period of time. We accomplished this approximation by using each score from the nonterminated group 11 times and coding each as "nonterminated." Thus, the total size of the new data set was 681, with 627 in the nonterminated group and 54 in the terminated group. This correlation was also significant ($r_{680} = .14$, $p < .0005$).

We could also correct for range restriction created by the use of the honesty subscale in selection by using the variance estimate for the unrestricted sample available in the manual from the publisher for this type of occupation (London House Press, 1986). Using the standard correction for range restriction, the corrected correlations are .35 for the original data and .19 for the data set approximating all applicants who were hired.

DISCUSSION

The results offer support for the predictive validity of the honesty subscale of the PSI and SEAI for detected employee theft. In the first independent study in which termination for theft served as the criterion and in which criterion variance was maximized, the honesty subscale of the PSI and the SEAI successfully predicted detected employee theft. The obtained correlation between the honesty score and detected theft (.28, $p < .01$) is in line with the mean uncorrected validity (.33) obtained in a meta-analysis of studies conducted by the publishers in which theft was used as the criterion (McDaniel & Jones, 1988). It is below the estimate obtained for overt integrity tests and narrow criteria (theft admissions, actual theft, and dismissal for theft) reported in Ones, Viswesvaran, and Schmidt's (1991) meta-analysis. We emphasize, however, that both of these meta-analyses include results

from studies with possible criterion contamination, a condition that inflates validity coefficients, and from studies that used criteria far less relevant than detected theft. Although the honesty subscale accounted for 8 percent of the uncorrected variance in the criterion, no other measure accounted for this amount of variance in the prediction of detected theft. Correcting for range restriction, we can account for over 10 percent of the variance in detected theft.

The London House PSI is one of the most heavily used and researched overt integrity tests (Sackett et al., 1989). Orban (personal communication, December 1992) reported that over half a million of these tests were administered in 1992 alone. Other popular tests include the Stanton Survey and the Reid Report. It would be difficult to generalize our results to other instruments, but our study of the items in and the theories behind the Stanton Survey and the Reid Report reveal strong similarities to the London House honesty subscale under study here (e.g., Ash, 1971; Kpo & Harris, 1986). Unfortunately, we could locate no studies in which scores on more than one integrity test were correlated. One study provided some evidence for the equivalency of two tests. Sackett and Harris (1984) reported similar patterns of correlations for the PSI and the Reid Report with factors measured by the 16 Personality Factors Questionnaire (Cattell, 1989).

No significant differences in subscale scores emerged as a function of race or gender, another area recommended for further study in the OTA (1990) report. This absence of adverse impact on the employment of individuals from all race and gender categories supports the American Psychological Association task force report (1991). Of course, our analysis is based on only the honesty subscale scores and not on the composite employability index that is typically used to make selection decisions with the PSI and SEAI.

Although the data provided by the company for this study maximized the criterion variance for detected theft, this should not be regarded as a serious problem with the analysis. Estimates of how many employees commit theft based on self reports, which are likely to underestimate actual theft, put the rate at between 32 and 75 percent of employees (e.g., Clark & Hollinger, 1983; Jones & Joy, 1988; Slora, 1989; Zemke, 1990). The best estimate for this particular industry based on the latest survey is 45 percent. Thus, the detected theft ratio of this study is more in line with projections of theft based on self-reports from other research. In fairness to the test publishers, the instruments were developed to predict employee theft, not detected theft. Research shows that the vast majority of employee theft is not detected (Clark & Hollinger, 1983). However, it is fair to conclude that the matched sample provided by the company created close to an ideal design for the validation effort and that failure to find significance with these data would have seriously undermined the claims of the test publishers. Although the matched sample approach creates problems in estimating effect size, there can be no question that the results from this study substantiate the validity of the honesty subscale, since there are no serious alternative ex-

planations for the significant correlation. To our knowledge, this is the first independent study showing that an honesty test actually predicts detected theft, perhaps the strongest data that can be offered to support the construct validity of such an instrument. The major advantage of the matched group design is that we were able to control for variables related to opportunity bias. We are also unaware of any other study that has controlled for these variables to this extent.

Further support for the validity of the instrument can be garnered from the analysis of the data set we created to approximate the data set for all persons selected on the basis of test scores. This correlation was also statistically significant, even though only 7 percent of the criterion scores were classified as terminated. Correcting this correlation for range restriction, we obtained an estimate of .19 in the prediction of detected theft.

We were not involved in maintaining the security of the test data and thus cannot claim with 100-percent certainty that the criterion data are uncontaminated. However, it was made clear to the organization studied that without assurance that there was no data contamination, the implications of a significant validity coefficient would be highly dubious. The research was undertaken with this condition understood by the company. As we emphasized above, previous research in which theft was used as the criterion has not even addressed the problem of contamination. In fact, the manual for the PSI explicitly recommends that supervisors pay particular attention to subscale scores on the instrument and that the scores should to some extent affect their behavior toward subordinates. The personnel representative from the company assured us that this recommendation was not followed so that the instrument could be properly validated.

Given the results of the OTA (1990) report, regulatory efforts are likely to increase in the area of honesty-integrity testing. The OTA recommendation for additional independent research using criterion-related external validity is critical for the defense or rejection of these instruments. Test publishers and their client businesses need to cooperate with independent researchers to assure that more research can be done on the validity and utility of honesty-integrity tests. Future research should use larger samples, address the adverse impact of specific cutoff scores, and compare the validities of more than one of the instruments currently marketed as predictors of employee theft.

Although our results support the predictive validity of honesty tests, further study is needed to test the incremental validity of the construct in the context of the so-called big five personality factors—the model of personality classification considered to be the most useful framework for the study of noncognitive individual differences (Goldberg, 1993)—and to investigate approaches designed to improve the validity of such instruments. Since no other legal method or instrument other than paper-and-pencil tests report criterion-related validities greater than zero in predicting theft, the low level of variance accounted for here is nonetheless of substantial practical significance. Future studies should address attempts to improve the validity of

honesty tests and to compare validities and utilities to those obtained using alternative methods designed to reduce the growing and pervasive problem of employee theft.

REFERENCES

- American Psychological Association. 1991. *Questionnaires used in the prediction of trustworthiness in pre-employment selection decisions: An A.P.A. task force report*. Washington, DC: American Psychological Association.
- Ash, P. 1971. Screening employment applicants for attitudes toward theft. *Journal of Applied Psychology*, 55: 161-164.
- Cattell, H. B. 1989. *The 16 personality factors: Personality in depth*. Champaign, IL: Institute of Personality and Ability Testing.
- Clark, J. P., & Hollinger, F. C. 1983. *Theft by employees in work organizations*. Rockville, MD: National Institute of Justice.
- Deutsch, C. H. 1990. Pen-and-pencil integrity tests. *Wall Street Journal*, February 11: 29.
- Food Marketing Institute. 1992. *Third annual report on employee theft in the supermarket industry*. Rosemont, IL: London House Press.
- Goldberg, L. R. 1993. The structure of phenotypic personality traits. *American Psychologist*, 48: 26-34.
- Inwald, R. 1990. Those little white lies of honesty test vendors. *Personnel*, 67: 52-58.
- Jones, J. W., & Joy, D. S. 1988. *Employee deviance base rates: A summary of empirical research*. Park Ridge, IL: London House Press.
- Joy, D. S. 1986. *The use of the Personnel Selection Inventory to reduce employee theft: A review*. Park Ridge, IL: London House Press.
- Kpo, W. R., & Harris, W. G. 1986. *Generalizability of an attitudinal-behavioral measure of integrity*. Paper presented at the annual meeting of the New England Psychological Association, Boston.
- Logan, T. G., Koettel, R. C., & Moore, R. W. 1986. Personality correlates of a test of honesty. *Psychological Reports*, 59: 1015-1018.
- London House Press. 1980a. *The Personnel Selection Inventory*. Park Ridge, IL: London House Press.
- London House Press. 1980b. *Test administration and analysis and instruction manual. The London House Personnel Selection Inventory*. Park Ridge, IL: London House Press.
- London House Press. 1986. *Station Employee Applicant Inventory*. Park Ridge, IL: London House Press.
- London House Press. 1987. *Personnel Selection Inventory information guide*. Park Ridge, IL: London House Press.
- McDaniel, M. A., & Jones, J. W. 1988. Predicting employee theft: A quantitative review of the validity of a standardized measure of dishonesty. *Journal of Business and Psychology*, 2: 327-345.
- Murphy, K. R. 1993. *Honesty in the workplace*. Belmont, CA: Brooks/Cole.
- Office of Technology Assessment. 1990. *The use of integrity tests for pre-employment screening*. OTA-SET-442. Washington, DC: U.S. Government Printing Office.
- Ones, D. S., Viswesvaran, C., & Schmidt, F. L. 1991. *Meta-analysis shows integrity tests are valid despite moderating influences*. Paper presented at the 3d Annual Conference of the American Psychological Society, Washington, DC.

- Orban, J. A. 1986. *Development and validation of the Station Employee Applicant Questionnaire*. Park Ridge, IL: London House Press.
- Sackett, P. R., Burris, L. R., & Callahan, C. 1989. Integrity testing for personnel selection: An update. *Personnel Psychology*, 42: 491–529.
- Sackett, P. R., & Harris, M. 1984. Honesty testing for personnel selection: A review and critique. *Personnel Psychology*, 37: 221–245.
- Slora, K. B. 1989. *The Personnel Selection Inventory: Conformance to the APA Division 14's principles for the validation and use of personnel selection procedures*. Park Ridge, IL: London House Press.
- Terris, W., & Jones, J. W. 1982. Psychological factors relating to employees' theft in the convenience store industry. *Psychological Reports*, 51: 1219–1238.
- Zemke, R. 1990. Do honesty tests tell the truth? *Training*, 27(10): 75–81.

H. John Bernardin received his Ph.D degree in industrial-organizational psychology from Bowling Green State University and is currently a university research professor at Florida Atlantic University. His research interests are individual differences, personnel selection, and performance appraisal.

Donna Cooke received her Ph.D degree in psychology from the University of Miami and is currently an assistant professor of organizational behavior at Florida Atlantic University. Her research interests are organizational commitment, mentoring, and turnover.

SOME TESTS OF THE SELF-INTEREST AND GROUP-VALUE MODELS OF PROCEDURAL JUSTICE: EVIDENCE FROM AN ORGANIZATIONAL APPEAL PROCEDURE

DONALD E. CONLON
University of Delaware

This study examined how outcome, appeal method, and group membership influenced judgments about procedural and distributive justice made by people who appealed parking violations using a university appeal procedure. It also compared two explanations for the effects of procedural justice. The results support the first explanation, the self-interest model of procedural justice, more than the second, the group-value model, though combining the two models provides the best explanation for some of the variables.

Research on dispute resolution and resource allocation has identified two central dimensions that people use when they evaluate the fairness of a procedure. One dimension, procedural justice, focuses on the procedure used to generate outcomes; the second, distributive justice, focuses on the outcomes themselves. Collectively, these justice concepts have been shown to be related to a number of important organizational attitudes and behaviors (e.g., Alexander & Ruderman, 1987). Clearly, people's perceptions about justice can be seen as "a basic requirement for the effective functioning of organizations and the personal satisfaction of the individuals they employ" (Greenberg, 1990: 399). I examined the influence of group member commitment, method of appeal, and outcome on the justice judgments of faculty and staff members and students who appealed parking violations at their university. The findings are used to provide insights into the validity of two recent explanations for procedural justice effects.

Thibaut and Walker (1975, 1978) guided early research on procedural justice, which centered on dispute resolution in legal settings. They posited that disputant control over the aspects of a process, called process control, or "voice," and outcome, or decision control, determined reactions to dispute resolution procedures. Recent theoretical and empirical work has extended

I am grateful to Richard Hester, Doug Tuttle, and Carol Rogers for making the names of appeal procedure users available for use in this study, and to Caroline Corneley and Michelle Zimlin for their help in identifying appellants as faculty, staff, or students. Thanks are also due to Howard Garland, William Ross, John Sawyer, Tom Tyler, and two anonymous reviewers for this journal for their comments on earlier drafts of this article.

considerations of procedural justice into a variety of situations, with very consistent results (see Lind & Tyler [1988] for a review). For example, in both laboratory (Kanfer, Sawyer, Earley, & Lind, 1987) and field (Lissak, 1983) settings, performance evaluation procedures that gave employees more process control were seen as more fair than procedures that limited employee input.

Recently, two models have been proposed to explain why procedural justice effects occur. The self-interest model, which is also called the instrumental model (cf. Tyler, 1987), suggests that people desire control over procedures because this control will increase the likelihood of favorable outcomes. To the extent that a procedure promotes the interests of or provides outcomes desirable to participants, their perceptions of justice will be enhanced. In contrast, the group-value model (Lind & Tyler, 1988) is an attempt to explain procedural justice effects in terms of group identification processes. The model's assumption is that individuals value their membership in groups, as groups provide their members with an identity as well as a mechanism to validate and reinforce the appropriateness of their beliefs and behavior (Brockner, Tyler, & Cooper-Schneider, 1992). Moreover, a group's members appreciate and support the procedures used in the group not only because procedures specify authority relations, but also because they articulate norms concerning decision making and fair treatment within the group (Martin, Feldman, Hatch, & Sitkin, 1983; Van Maanen & Schien, 1979). Thus, when the procedures used in groups correspond with the fundamental values of the group and its members, their perceptions of justice should be high.

Lind and Tyler (1988) discussed the two models not as competing theories but as complements that together explain most of the findings in the procedural justice literature. Nevertheless, I sought to compare how well the models could explain the results of a data set derived from an organizational appeal procedure because they specify different mechanisms as determinants of justice judgments and evaluations of institutions and authorities.

HYPOTHESES

Several laboratory studies have shown that outcomes have strong effects not only on distributive justice, but on ratings of procedural justice and of third parties intervening in disputes (e.g., Conlon & Fasolo, 1990). These findings support the self-interest model prediction that outcomes will exert strong effects not only on distributive justice judgments, but also on judgments of procedures and the parties responsible for the outcomes. However, in most experimental studies, justice judgments are recorded immediately after disputants receive notice of an outcome. Some scholars have suggested that outcomes may have only temporary, short-term effects on judgments of procedures and institutions (e.g., Lind & Earley, 1991). In the field study reported here, justice perceptions were measured up to 18 months after appellants received notice of outcomes. If outcomes influence more than

distributive justice judgments after this much time, there is strong support for the generality of the self-interest model.

Hypothesis 1a: Appellants whose appeals are granted will perceive distributive justice as higher than will appellants whose appeals are denied.

Hypothesis 1b: Appellants whose appeals are granted will perceive procedural justice as higher than will appellants whose appeals are denied.

Hypothesis 1c: Appellants whose appeals are granted will evaluate the appeal board that made the decisions more favorably than will appellants whose appeals are denied.

In contrast to the focus on outcomes of the self-interest model, the group-value model suggests that group membership and procedures are the primary determinants of justice judgments. Lind and Tyler (1988) suggested that committed group members, who hold the group in high esteem, might see its procedures as fair simply because they strongly endorse them. As a consequence, such members should also be likely to comply with the decisions emanating from the procedures and express support for the group members who occupy decision-making roles, especially if they receive a favorable result from the procedures. Support for this assertion comes from Tyler (1990), who found that people with strong loyalty to an organization judge their interaction with the institutions of the organization to be more fair than do people with less loyalty. These sources support the group-value prediction that highly committed members for whom outcomes are favorable should express the most favorable judgments about the procedures and the mechanism responsible for the outcomes, such as an appeal board.

However, a high level of commitment can be a two-edged sword; some recent evidence suggests that when unfavorable outcomes occur, the strongest negative reactions are from those who were, prior to the encounter, the most highly committed members of a group. Following the group-value model, Brockner and colleagues (1992) suggested that highly committed members care very strongly about how they are treated within a group, so unfavorable outcomes pose a greater threat to their self-worth and self-esteem than do similar outcomes for less committed members. This logic suggests that committed organization members for whom the outcomes of decisions are unfavorable will have very negative reactions to the procedures and the mechanism responsible for the outcomes.

Hypothesis 2a: Compared to less committed organization members, highly committed members will perceive procedural justice as lower when their appeals are denied but as higher when their appeals are granted.

Hypothesis 2b: Compared to less committed organization members, highly committed members will evaluate the

appeal board that made the decisions less favorably when their appeals are denied, but more favorably when their appeals are granted.

I also examined how the method of appeal influenced perceptions of justice and the third party. Recent experimental work suggests that variations in how procedures are administered or executed influence subsequent evaluations of justice (Conlon & Fasolo, 1990; Lind & Lissak, 1985). The appeal procedure studied here allowed grievants the choice of appealing their violations in person or in writing, thus providing a naturally occurring variation in an organizational conflict-management procedure. Much of the procedural justice literature (e.g., Folger, 1986; Lind & Lissak, 1985) emphasizes the importance disputants place on having process control. Both the self-interest and group-value models suggest that in-person appeals enhance perceptions of voice and procedural justice, though the models differ in how they explain why this enhancement occurs.

In the self-interest model, voice is seen as a means to an end, with the end being a favorable—or at least fair—outcome. Control over and expression of arguments is valued because a disputant cannot control the outcome: decision control is low. In-person appeals would thus be preferred over written appeals because the appellants would be more certain that the decision makers (here, the appeal board) heard and understood the appeal, thereby increasing the likelihood of the appellants' receiving a favorable judgment.

In the group-value model, voice is seen as a mechanism by which group members reaffirm their stature and inclusion in a group. Participation in the process provides benefits because it reinforces members' sense of belonging to the group, regardless of whether the ultimate outcome is favorable. In-person appeals also have features that written appeals lack; these include two-way communication, nonverbal communication, such as body language, tone of voice, the expression and recognition of emotion, and the ability to interact directly with decision makers, and they contribute to aspects of group membership. Thus, the two models suggest a voice-driven hypothesis:

Hypothesis 3a: Appellants who appeal decisions in person will see themselves as having higher process control than will those who appeal in writing.

Hypothesis 3b: Appellants who appeal decisions in person will judge procedural justice as higher than will those who appeal in writing.

Finally, following Greenberg's (1990) exhortation, I examined whether perceptions of procedural and distributive justice influenced reactions to the university appeal board studied here. Recent theoretical and empirical work (e.g., Folger & Konovsky, 1989; Lind & Earley, 1991; McFarlin & Sweeney, 1992; Tyler, 1990) contains the argument that procedural justice perceptions are a more important predictor of evaluations of organizational representa-

tives and institutions than are distributive justice perceptions, but distributive justice perceptions are a more important predictor of evaluations of personal outcomes, such as pay. This argument suggests that in this study, evaluations of the appeal board, an institution in place at the university, would be related more closely to procedural justice than to distributive justice.

Hypothesis 4: Perceptions of procedural justice will account for more of the variance in appeal board evaluations than will perceptions of distributive justice.

METHODS

A pilot survey revealed that faculty and staff members displayed greater organizational commitment than students. An 11-item survey based on the Organizational Commitment Questionnaire (Mowday, Porter, & Steers, 1982) was sent to random samples of 100 students and 100 faculty or staff members; all names were picked from the student or faculty-staff telephone directory. The items focused on loyalty and satisfaction with choosing or being a part of the university; this wording ensured that faculty and staff members and students would interpret the items similarly. Responses were received from 76 faculty or staff members and 57 students. As responses were highly correlated across items, I summed them into a single organizational commitment scale ($\alpha = .92$) with a potential range of 11 to 77. The mean score on this scale for faculty-staff was 61.09 (s.d. = 12.30), and the mean score for students was 56.86 (s.d. = 10.75). The two means differed significantly ($t_{131} = 2.11, p < .04$), suggesting that faculty and staff members at this university had stronger commitment to it than did students.¹

The Parking Citation Appeal Procedure

To appeal a parking citation, appellants completed a request-for-appeal form within two weeks of the violation date. They indicated on the form whether they wished to appeal in writing or in person. Those who appealed in writing were asked to provide detailed reasons why their citations should be rescinded. They then returned the completed forms to the public safety department. The manager of the public safety department scheduled hearings with the appeal board for personal appeals. The makeup of the appeal board was somewhat fluid. A minimum of four members of the board, which consisted of faculty and staff members and students, had to be present for appeals to be heard; appeals were rescheduled if fewer than four members were available.

¹ In addition, faculty and staff members undergo a more thorough university-wide socialization process than do students, and the behavioral, affective, and financial consequences of commitment are more numerous and extreme for employees (Mowday et al, 1982; O'Reilly & Chatman, 1986). These instrumental forces operate in addition to the value internalization processes discussed by the group-value model.

The board met for two hours a week, and those appealing in person were scheduled to appear at 15-minute intervals. Personal appeals typically lasted about 10 minutes, after which the appellant was excused and the appeal board discussed the case and made a decision. After the in-person appeals were considered, the board considered any written appeals it had received. Whether people appealed in person or in writing, they received notice of the outcome—the granting or denial of the appeal—through the mail approximately two weeks later. Those who had their appeal denied had to pay their fine, plus a \$10 late fee. No additional appeals were allowed.

Archival Data

The director of the department of public safety provided written records containing the names of all the individuals who had used the appeal procedure in the 18 months prior to data collection. These records also provided information about whether people had appealed in person or in writing and the disposition of each case. The names on the list were classified as faculty-staff or student by looking them up in the faculty-staff and student telephone directories.

A total of 241 names (161 students, 32 faculty members, 48 staff members) were classified; of the 241, 113 people appealed their fines in writing (47%), and 128 appealed in person (53%). The roster indicated that 58 appeals (24%) had been denied and 113 appeals (47%) had been granted. Outcome data were missing on the remaining 70 cases (29%), though the Department of Public Safety assured me that the cases had been decided; the fact that record keeping was not up to date accounted for the discrepancy. Overall, the data suggest that the appeal procedure was quite friendly to appellants, as they appeared to win their cases much of the time.

Although the archival data indicated that the overall frequencies of appealing in person and in writing were similar, faculty and staff members were more likely to appeal in writing (53) than in person (27), whereas students appealed more often in person (101) than in writing (60), yielding a significant difference between the groups ($\chi^2_1 = 18.23, p < .001$). The procedure also delivered favorable outcomes more frequently to faculty and staff members than to students ($\chi^2_1 = 10.92, p < .001$). Among faculty and staff members, only 10 (5 faculty, 5 staff) of 57 had their appeals denied (18%); among students, 48 of 114 had their appeals denied (42%).

Survey Administration and Development of Dependent Measures

Surveys were mailed to the 241 potential participants through campus mail. Five surveys sent to a faculty or staff member were returned because the party addressed could not be located or had moved, reducing the potential sample to 236. I received responses from 72 of 161 students (45%) and 43 of 75 faculty or staff members (57%). Thus, 115 of 236 possible surveys were returned, for an overall response rate of 49 percent.

The number of faculty (15) and staff (28) respondents represented a proportion consistent with the demography of the university, which had 922

faculty members (27%) and 2,477 staff members (73%). Nine faculty respondents (60%) were men, 6 (40%) were women, again reflecting the proportions of men (630, 68%) and women (292, or 32%) on the university's faculty. Among the staff respondents, 19 were women (68%), as were 1,494 of 2,477 staff members at this university, or 60 percent. The 24 men and 48 women among the student respondents also represented a distribution consistent with the university student population (8,299 of 14,655 were women, or 57 percent). Thus, the final sample was similar to the university population as a whole.

The survey began by asking appellants to indicate their relationship with the university, the violation they had been charged with, their method of appeal, and the disposition of their appeal. On separate pages following these questions, respondents were asked to consider the outcomes of their appeals, the appeal procedure, and the appeal board, using nine-point semantic differential scales. I constructed a distributive justice scale from three questions measuring appellants' satisfaction and happiness with the outcomes of their appeals and sense that the outcomes were fair ($\alpha = .94$). A procedural justice scale was constructed from two questions measuring satisfaction with and the fairness of the procedure ($r = .84$). A scale measuring voice (process control) was constructed from two items measuring appellants' perceptions of their opportunity to present evidence and state their cases ($r = .57$). A two-item correlation of .57 is analogous to a reliability coefficient greater than .70 (Carmines & Zeller, 1979).

The final pages of the survey asked respondents to consider the appeal board. The ten measures concerning the appeal board were highly correlated and combined into a single appeal board evaluation scale ($\alpha = .91$). Items in this scale included measures of trust in and satisfaction with the appeal board and assessments of beliefs that the board acted fairly and impartially and that its members considered appellants' views and thoroughly evaluated all the information available before making their decision. Table 1 gives means, standard deviations, and correlations for these four scales and the dollar values of the fines assessed for the various violations.²

RESULTS

An initial examination of the response data revealed several noteworthy findings. It appeared that students committed different types of violations

² I kept the procedural and distributive justice measures as separate constructs in spite of their high correlation for several reasons: (1) previous research has treated them as independent constructs, (2) questionnaire measures of these concepts have been shown to be statistically independent, and (3) employees do in fact distinguish between the two types of justice (see Greenberg [1990: 404-407] for a thorough review of this issue). In addition, other studies have discovered that the variables explain unique variance in other variables (Alexander & Ruderman, 1987; McFarlin & Sweeney, 1992). A subgroup analysis of the relationship between the two measures in this data set revealed a considerably weaker correlation among appellants whose appeals were granted than among those whose appeals were denied.

TABLE 1
Means, Standard Deviations, and Correlations^a

Variables	Means	s.d.	1	2	3	4
1. Procedural justice	6.30	2.66				
2. Voice	6.50	2.09	.44			
3. Appeal board evaluation	5.92	2.17	.79	.54		
4. Distributive justice	6.64	3.32	.70	.19	.68	
5. Value of fine	15.40	10.74	-.11	-.09	-.16	-.15

^a All correlations greater than .20 are significant at $p < .05$ or more.

than faculty and staff ($\chi^2_8 = 19.52, p < .02$). Table 2 shows these findings. The most frequent ticket issued to the students in our sample, for parking in a fire lane, was a rare violation for faculty and staff. In addition, faculty and staff members never received tickets for parking meter violations, but this violation was the third most common for students. Students tended to use metered spaces more than faculty because the reserved parking lots for most students were farther away from the center of campus than the reserved lots for the faculty and staff.

Although faculty and staff members and students committed different types of infractions, there was some degree of overlap: five violations appeared to have been committed by the two groups with a roughly similar frequency. These five violations (a total of 66 cases) are highlighted in Table 2 by asterisks. For this subset of violations committed by both groups, it is interesting to note that faculty and staff members reported winning 87 percent of their appeals, but students reported winning only 66 percent of their appeals, a significant difference ($\chi^2_1 = 4.26, p < .04$).³

Two other patterns warrant discussion. The appeal procedure was more generous to faculty and staff members (only 5 of 43 appeals reported denied) than to students (33 of 72 appeals were denied) ($\chi^2_1 = 12.21, p < .001$). These reports are consistent with the pattern present in the archival data: according to the roster, only 10 of 57 faculty or staff members lost their appeals. Also, 67 of 87 in-writing appellants had their appeals granted (77%), but only 9 of 27 in-person appellants had their appeals granted (33%; $\chi^2_1 = 16.94, p < .001$). This reported pattern was somewhat similar to that in the archival data, which showed that 68 percent of the in-writing appeals were granted. However, in the roster, 65 percent of the in-person appeals were granted, which is a higher rate than that reported by respondents.

Hierarchical regression analysis was used to test the hypotheses. For each regression equation, I first entered the dollar value of the fine attached to a violation as a control variable. This variable also served as a reasonable

³ The results appear even more suspicious if we examine only the "parking in lot or space unauthorized to use" violation. Faculty and staff members won their appeals of this violation in 15 of 16 cases, but students won their appeals of this violation in only 13 of 22 cases ($\chi^2_1 = 6.55, p < .01$).

TABLE 2
Pattern of Violations by Group Membership

Violations	Faculty and Staff	Students
Parking in lot or space unauthorized to use*	16	22
Lacking valid permit*	3	3
Unauthorized parking in reserve space*	3	3
Unauthorized parking in handicapped space*	1	2
Parking on driveway or accessway*	8	5
Meter violation	0	8
Failure to display transferrable permit	2	0
Parking in fire lane	6	23
Parking or driving on walks or grass	3	6
Appeal denied ^a	4	12
Appeal granted ^a	27	23

^a Outcome statistics are for the violations marked with asterisks.

surrogate for the severity of the infraction, as more serious offenses, such as parking in a fire lane or a handicapped area, each a \$30 fine, were fined more heavily than less serious offenses—for example, an expired meter was \$2. After the control variable, I entered each of the following independent variables on separate steps: (1) outcome, (2) method of appeal, and (3) group membership.⁴ Next, the two-way interactions were entered on separate steps. Finally, the three-way interaction of outcome, group, and method of appeal was entered. Table 3 shows regression results for the four dependent variables in the study.

Hypotheses 1a, 1b, 1c and the self-interest model predict that favorable outcomes will be associated with perceptions that distributive justice and procedural justice are high and with favorable evaluations of the appeal board. These hypotheses received very strong support, supporting the self-interest model's focus on outcomes as the primary determinant of justice judgments. In fact, outcome by itself explains most of the variance in perceptions of distributive and procedural justice and appeal board evaluations. Granted appeals led to more favorable perceptions of distributive justice ($\bar{x} = 8.88$ vs. 2.10), procedural justice ($\bar{x} = 7.76$ vs. 3.38), the appeal board ($\bar{x} = 7.08$ vs. 3.64), and voice ($\bar{x} = 6.88$ vs. 5.72) than did denied appeals.

Hypothesis 2a states that, relative to less committed group members (students), more committed members (faculty and staff) will perceive procedural justice as lower when their appeals are denied but as higher when their appeals are granted, thus implying a significant interaction between group membership and outcome. Although this interaction did not emerge

⁴ The rationale for this method of entry is that the self-interest model predates the group-value model, and differences in procedure (method of appeal) predate concerns with group membership in the procedural justice literature. Moreover, it is important to test the degree to which the group-value model helps explain the results beyond the more parsimonious explanation the self-interest model provides.

TABLE 3
Results of Hierarchical Regression Analyses^a

Step	Variables	Distributive Justice		Procedural Justice		Appeal Board		Voice	
		R ²	ΔR ²	R ²	ΔR ²	R ²	ΔR ²	R ²	ΔR ²
1	Value of fine	.02		.01		.03		.01	
2	Outcome	.93	.91***	.61	.60***	.57	.54***	.07	.06***
3	Appeal	.93	.00	.61	.00	.58	.01	.11	.04*
4	Group	.93	.00	.61	.00	.58	.00	.14	.03*
5	Outcome × appeal	.93	.00	.62	.01	.58	.00	.14	.00
6	Outcome × group	.94	.01	.62	.00	.58	.00	.17	.03*
7	Appeal × group	.94	.00	.62	.00	.58	.00	.18	.01
8	Outcome × appeal × group	.94	.00	.68	.05***	.65	.07***	.20	.02
df		8,105		8,105		8,101		8,105	
F		221.61***		27.61***		23.85***		3.25**	

^a Results are based on 114 respondents, except those for the appeal board measure, which are based on 110 respondents.

* $p < .05$

** $p < .01$

*** $p < .001$

as significant, the three-way interaction between outcome, group membership, and method of appeal significantly affected procedural justice judgments.

The three-way interaction suggests that faculty and staff members had more extreme reactions than students. However, the results should be interpreted cautiously because the number of in-person appeals made by faculty or staff respondents was small. When appeals were denied, faculty or staff members who appealed in writing ($N = 4$, $\bar{x} = 1.63$) perceived the least procedural justice; ratings for students who appealed in writing and in person were less extreme ($Ns = 16$ and 17 , $\bar{x}$'s = 3.22 and 3.76 , respectively). When appeals were granted, faculty or staff members who appealed in writing perceived the highest levels of procedural justice ($N = 36$, $\bar{x} = 8.13$); procedural justice perceptions for students whose appeals were granted were lower ($Ns = 31$ and 8 , $\bar{x}$'s = 7.48 and 7.38 , written and in-person appeals, respectively).⁵ These patterns support Hypothesis 2a and the group-value model.

Hypothesis 2b and the group-value model predict the same pattern for evaluations of the appeal board. Once again, there is no significant interaction between outcome and group membership, but there is a significant three-way interaction. Among respondents whose appeals were denied, the least favorable evaluations of the appeal board were from faculty members who appealed in writing ($N = 4$, $\bar{x} = 2.46$). Evaluations of the appeal board by students who lost their appeals were not as harsh ($Ns = 16$ and 17 , $\bar{x} = 3.61$ and 3.94 , written and in-person appeals). For granted appeals, the most favorable evaluation of the appeal board came from the one faculty-staff respondent who appealed in person ($\bar{x} = 7.58$); student evaluations of the appeal board were not as favorable ($Ns = 31$ and 8 , $\bar{x}$'s = 6.73 and 7.41 , written and in-person appeals). I hesitate to argue that the pattern supports the group-value model, however, as the predicted most favorable evaluation of the appeal board was found for only one respondent.⁶

Hypotheses 3a and 3b, based on both the self-interest and group-value models, predict that appellants who appeal in person will perceive both process control and procedural justice as higher than will those who appealed in writing. This hypothesis received support for perceptions of voice, but not for perceptions of procedural justice. Method of appeal, entered on

⁵ Because most of the respondents appealed in writing (87 of 114), I conducted a separate regression analysis of those who appealed in writing. After entering the value of the fine, outcome (which was still highly significant), and group membership on separate steps, entering the outcome-by-group interaction term resulted in a significant improvement ($p < .01$) in overall R^2 , consistent with Hypothesis 2a and the group-value model.

⁶ I performed the same hierarchical regression analysis mentioned in footnote 5 for evaluations of the appeal board. In this instance, there was no significant improvement in R^2 when the outcome-by-group interaction term was entered. Thus, this supplemental analysis among in-writing appellants does not support Hypothesis 2b or the group-value model.

step 3 of the hierarchical regression analysis, explained a significant amount of variance in the voice measure over and above that explained by the control variable and the other two independent variables. As expected, in-person appeals led to greater voice perceptions ($N = 27$, $\bar{x} = 6.78$) than did written appeals ($N = 87$, $\bar{x} = 6.41$).

There was also an effect for group membership, qualified by a significant interaction between outcome and group membership, on perceptions of voice. Faculty members who won their appeals perceived themselves as having the most voice in the procedure ($N = 38$, $\bar{x} = 7.43$), followed by students who won their appeals ($N = 39$, $\bar{x} = 6.36$), followed by students who lost their appeals ($N = 33$, $\bar{x} = 5.89$), followed by faculty who lost their appeals ($N = 5$, $\bar{x} = 4.60$). This pattern supports the group-value model thesis that more committed members have more extreme reactions to institutional procedures.

Hypothesis 4 concerns the relative influence of procedural and distributive justice on evaluations of the appeal board. To test this hypothesis, I entered procedural and distributive justice separately as two additional steps in the hierarchical regression analysis for the appeal board measure shown in Table 3. When procedural justice was entered first, it explained an additional 5 percent of the variance ($R^2 = .71$, $\Delta F = 18.55$, $p < .001$). When distributive justice was entered following procedural justice, it also explained an additional 5 percent of the variance ($R^2 = .75$, $\Delta F = 18.69$, $p < .001$). However, when the order of entry was reversed, distributive justice accounted for all of the additional variance ($R^2 = .75$, $\Delta F = 40.73$, $p < .001$). The procedural justice measure accounted for no additional variance ($\Delta F = 0.47$, n.s.).

DISCUSSION

The results provide considerable support for the self-interest model. Outcome explained most of the variance in measures of distributive and procedural justice as well as in evaluations of the appeal board. In addition, distributive justice was a more useful predictor of appeal board evaluations than was procedural justice. These findings sharply contradict recent arguments that procedures and group membership will affect judgments of organizational institutions more than outcomes will (e.g., Lind & Earley, 1991). Given that other studies have found procedural justice to be a more important predictor of organizational outcomes, such as evaluations of supervisors, it is curious to find here that outcome favorability and distributive justice judgments strongly influenced evaluations of the appeal board.

One explanation that reconciles these disparate findings can be offered. It may be that the frequency of group members' interaction with a particular institution influences their evaluation of it. More frequent interaction may increase the stability of opinions about the organizational mechanism. In such cases, an occasional unfavorable outcome may be balanced by the reflection that, over time, the mechanism produces favorable, or at least fair,

outcomes. Although employees' interactions with some types of organizational mechanisms, such as annual performance appraisals, may be frequent or regular, the mechanism studied here was one with which most respondents had little or no familiarity. Given that lack of familiarity, perhaps it is not surprising that outcome was such a strong determinant of evaluations of the appeal board. This argument suggests that the group-value model needs to include the degree of experience or familiarity members have with an organization's institutions: Familiarity may be a key mechanism by which group members come to support those institutions.

The group-value model was of some use in explaining the findings in this study. The significant three-way interactions affecting procedural justice and appeal board perceptions support the model's premise that members with the strongest ties or commitments to an organization will make more extreme procedural justice judgments than members with weaker ties. These findings are also consistent with recent research by Brockner and colleagues (1992), who found that the most negative reactions to citizen-police interactions came from citizens who had expressed a high level of commitment to the police but in a subsequent interaction with the police or courts felt that they had been treated unfairly.

The group-value model also provides an explanation for the archival data demonstrating that faculty and staff members appealed most often in writing and students appealed most often in person. Students may feel the need to appeal in person because they are less certain about their status in the group. Faculty members are more certain of their stature, and presumably, of the likely outcomes of their appeals, and may find it less necessary to appeal in person. This finding reinforces the importance of institutions treating in-person grievants with respect, an interpersonal aspect of fairness espoused in the group-value model.

Although in-person appeals led to stronger perceptions of voice than written appeals, the type of appeal did not affect perceptions of procedural justice. This finding is surprising as numerous studies have shown that perceptions of voice as high enhance perceptions of procedural justice. Lind and Tyler (1988: 204) listed 24 studies supporting this relationship. However, it is important to remember that the appellants who used written appeals in this procedure chose not to appeal in person. The opportunity to exercise voice, and not its actual exercise, may be all that is needed to enhance perceptions of procedural justice. In fact, the opportunity itself can be considered a form of voice, because it constitutes participation in the procedure.⁷

Because procedural justice effects may depend on the opportunity for or perception of voice rather than on its enactment, organizational procedures could be designed to give an organization the benefits of voice without offering organization members real voice (Sheppard, Lewicki, & Minton,

⁷ I thank an anonymous reviewer for this journal for making this point explicit.

1992). Thus, unscrupulous decision makers could rig procedures so that they appeared to be fair yet were in fact quite biased. In fact, the paucity of restrictions on organizational procedures might make such abuses likely in organizations (Lind & Tyler, 1988). However, if participants feel that a procedure is biased or improper, perceptions of procedural justice as low can follow, especially when they receive unfavorable judgments from procedures that appear to be fraudulent (Lind & Lissak, 1985).

Although the appeal procedure studied here afforded many grievants favorable judgments, it was particularly charitable to faculty and staff members, even when faculty, staff, and students were all appealing the same violations. Power or status differences between faculty-staff and students may explain the different success rates in appealing citations. Of course, there are alternative explanations for this finding—it might be that the greater maturity and education of the faculty and staff members allowed them to present their appeals better. The explanations that faculty and staff members provide in their appeals may be different from those students advanced.

Of course, the findings must be tempered by considering the limits of the methodology, the sample itself, including its size, and the covariations among the independent variables. Respondents were not randomly assigned to in-person and written appeal procedures, and most organizational procedures do not allow members to choose a method of appeal. The appeal board did not provide explanations for its decisions; past research has shown that adequate explanations can mitigate the effects of negative outcomes (e.g., Bies, 1989). Data on all measures were obtained retrospectively. Those who had not appealed recently may have recalled their experiences less vividly or been more subject to retrospective attributions. Outcomes from parking citations are hardly as important as outcomes regarding pay raises or promotions. The number of faculty-staff members who had their appeals denied was very small in our sample and in the university records. Finally, since turnover among students is greater and more regular than it is for faculty and staff, students may have been less knowledgeable about the leniency likely to result from use of the appeal procedure.

Universities are in many ways atypical organizations: less bureaucratic organizations would not have the myriad of procedures typically found in a university. Many companies provide ample parking for their workers and would have no need for the appeal mechanism studied here. University members may have unique characteristics that distinguish them from employees in other organizations. Concurrent membership in other groups or occupational communities both within and beyond the university setting may affect the levels of commitment of faculty, staff, and students. For example, business faculty members may have strong allegiances to professional associations such as the Academy of Management, and students often have ties to fraternities and sororities. These memberships may make university people less committed to their organization than are members of other organizations. They may resemble part-time workers whose other al-

legiances result in lower levels of organizational commitment than full-time workers display. The differences between universities and other organizations and their respective memberships suggest that applying the findings from this study to other organizations should be done cautiously.

REFERENCES

- Alexander, S., & Ruderman, M. 1987. The role of procedural and distributive justice in organizational behavior. *Social Justice Research*, 1: 117-198.
- Bies, R. J. 1989. Managing conflict before it happens: The role of accounts. In M. A. Rahim (Ed.), *Managing conflict: An interdisciplinary approach*: 83-92. New York: Greenwood.
- Brockner, J., Tyler, T. R., & Cooper-Schneider, R. 1992. The influence of prior commitment to an institution on reactions to perceived unfairness: The higher they are, the harder they fall. *Administrative Science Quarterly*, 37: 241-261.
- Carmines, E., & Zeller, R. 1979. *Reliability and validity assessment*. Beverly Hills, CA: Sage.
- Conlon, D. E., & Fazio, P. 1990. The influence of speed of third-party intervention and outcome on negotiator and constituent fairness judgments. *Academy of Management Journal*, 33: 833-846.
- Folger, R. 1986. Mediation, arbitration, and the psychology of procedural justice. In R. J. Lewicki, B. H. Sheppard, & M. H. Bazerman (Eds.), *Research on negotiation in organizations*, vol. 1: 57-80. Greenwich, CT: JAI Press.
- Folger, R., & Konovsky, M. A. 1989. Effects of procedural and distributive justice on reactions to pay raise decisions. *Academy of Management Journal*, 32: 115-130.
- Greenberg, J. 1990. Organizational justice; Yesterday, today, and tomorrow. *Journal of Management*, 16(2): 399-432.
- Kanfer, R., Sawyer, J., Earley, P. C., & Lind, E. A. 1987. Participation in task evaluation procedures: The effects of influential opinion expression and knowledge of evaluative criteria on attitudes and performance. *Social Justice Research*, 1: 235-249.
- Lind, E. A., & Earley, P. C. 1991. *Some thoughts on self and group interests: A parallel-processor model*. Paper presented at the annual meeting of the Academy of Management, Miami.
- Lind, E. A., & Lissak, R. I. 1985. Apparent impropriety and procedural fairness judgments. *Journal of Experimental Social Psychology*, 21: 19-29.
- Lind, E. A., & Tyler, T. R. 1988. *The social psychology of procedural justice*. New York: Plenum.
- Lissak, R. I. 1983. *Procedural fairness: How employees evaluate procedures*. Unpublished doctoral dissertation, University of Illinois, Urbana.
- McFarlin, D. B., & Sweeney, P. D. 1992. Distributive and procedural justice as predictors of satisfaction with personal and organizational outcomes. *Academy of Management Journal*, 35: 626-637.
- Martin, J., Feldman, M., Hatch, M. J., & Sitkin, S. B. 1983. The uniqueness paradox in organizational stories. *Administrative Science Quarterly*, 28: 438-453.
- Mowday, R. T., Porter, L. W., & Steers, R. M. 1982. *Employee-organization linkages: The psychology of commitment, absenteeism, and turnover*. New York: Academic Press.
- O'Reilly, C., & Chatman, J. 1986. Organizational commitment and psychological attachment: The effects of compliance, identification, and internalization on prosocial behavior. *Journal of Applied Psychology*, 71: 492-499.

- Sheppard, B. H., Lewicki, R. J., & Minton, J. 1992. *Organizational justice*. New York: Free Press.
- Thibaut, J. W., & Walker, L. 1975. *Procedural justice: A psychological analysis*. New York: Erlbaum/Halstead.
- Thibaut, J. W., & Walker, L. 1978. A theory of procedure. *California Law Review*, 66: 541–566.
- Tyler, T. R. 1987. Conditions leading to value expressive effects in judgments of procedural justice: A test of four models. *Journal of Personality and Social Psychology*, 52: 333–344.
- Tyler, T. R. 1990. *Why people obey the law*. New Haven: Yale University Press.
- Van Maanen, J., & Schein, E. H. 1979. Toward a theory of organizational socialization. In B. Staw (Ed.), *Research in organizational behavior*, vol. 1: 209–264. Greenwich, CT: JAI Press.

Donald E. Conlon is an associate professor of management in the Department of Business Administration, College of Business and Economics, University of Delaware. He received his Ph.D. degree in business administration from the organizational behavior group at the University of Illinois, Urbana-Champaign. His current research examines perceptions of fairness, third party–assisted dispute resolution, and decision making.

DEVELOPER-USER INTERACTION AND USER SATISFACTION IN INTERNAL TECHNOLOGY TRANSFER

DOROTHY LEONARD-BARTON

Harvard University

DEEPAK K. SINHA

Purdue University

Effective internal technology transfer—the implementation of technical systems developed and disseminated to operational subunits within a single organization—depends not only upon the cost, quality, and compatibility of the technology, but also upon two processes of interaction between developers and users. These are user involvement in development and adaptation by the developers and users of both the technical system itself and the workplace. Analyses of data from 34 projects in four large electronics companies provide support for our hypotheses.

We report results from an exploratory study of the impact of several technology characteristics and transfer processes on the success of transfers of internally developed technologies. New technologies deployed in support of internal operations give a company a significant competitive advantage (Porter, 1985). Yet, a decade after Kimberly noted “remarkably few attempts” (1981: 90) to study the transfer of internally developed technology, little theory exists. The research reported here focuses on the critical direct interaction between the developers of new software systems, and their users, within the bounds of single organizations and during initial implementation.

DETERMINANTS OF SUCCESS IN INTERNAL TECHNOLOGY TRANSFER

We suggest that success in technology transfer, which we define in terms of user satisfaction, depends upon both the characteristics of the technology and the processes of technology transfer.

Technology Characteristics

Primary characteristics. Downs and Mohr (1976) proposed two kinds of innovation characteristics affecting innovation success, primary and second-

We thank Mark Leiter and Linda Moffat for research assistance, the Harvard University Graduate School of Business Administration Division of Research for financial support, colleagues Claudia Schoonhoven and Oscar Hauptman for helpful comments on an earlier draft of this article, and three anonymous reviewers for this journal for their efforts.

ary. Primary characteristics do not vary across situations and can be evaluated against some objective standard. Although every technical system is idiosyncratic, strong technical performance is a generalizable primary characteristic long regarded as necessary for system acceptance and use (Powers & Dickson, 1973). Another widely suggested primary characteristic influencing user satisfaction is cost effectiveness. Our first two hypotheses, relating to the two primary characteristics, are:

Hypothesis 1: The performance of a new technical system will be positively associated with user satisfaction.

Hypothesis 2: The cost effectiveness of a new technical system will be positively associated with user satisfaction.

Secondary characteristics. These are characteristics not inherent in an innovation itself and hence different for various sets of users. Compatibility, defined as "the degree to which an innovation is perceived as being consistent with the existing values, past experiences and needs of potential adopters" (Rogers, 1983: 15), is an oft-cited secondary characteristic. In a meta-analysis of innovation studies, Tornatzky and Klein (1982: 33) found compatibility to be the most commonly used predictor of innovation adoption, although most studies examined did not distinguish between compatibility with values or norms and compatibility with existing practices. Because of our focus on users in the aggregate and on the acceptance of innovation in a work context, compatibility with current user operations was more relevant to our study. Therefore, we defined the compatibility of a system as its fit with the current equipment, task requirements, and skill base in the users' workplace. We expected to find that:

Hypothesis 3: A new technical system's initial fit with the current equipment, task requirements, and skill base in a workplace will be positively associated with user satisfaction.

Transfer Processes

Mutual adaptation. A technical system transferred from a development site to a user site always encounters differences in context: equipment, operators' skills, and performance rewards all may differ. Moreover, laboratory tests do not adequately simulate user workplaces. Chemical processes react unpredictably when brought from petri dish quantities up to full production volume; large integrated software programs may "crash" when all the modules are finally interconnected. Thus, even if developers successfully meet their original technical objectives, new technology often requires fine-tuning in the operating environment. Users are no more prescient than developers about the changes in their workplace that will allow them to best exploit a new technology. A factory statistical control system that seems to be merely an incremental alteration may in fact require entirely new operator skills.

Therefore many authors have noted instances of adaptation in which either (1) a technology is reinvented by its users to suit their needs (Johnson & Rice, 1987; Rice & Rogers, 1980; Souder, 1987) or (2) a workplace adapts, with reeducation of workers and changes in their rewards (Zuboff, 1982), new work roles, or other organizational changes occurring (Barley, 1986).

Past studies have focused on postimplementation adaptation rather than adaptation during development and transfer and have emphasized one of these adaptation processes to the exclusion of the other. In contrast, we studied technology as it is first implemented, at "the point at which it is most susceptible to influence" (Weick, 1990: 21). Agreeing with Child, Ganter, and Kieser that technologies "provide opportunities for organizational innovation" (1987: 87), we considered both types of adaptation, adaptation during development and during transfer, to be important. Following Leonard-Barton's (1988) finding that failures occurred when the developers of technical systems or their users were unwilling (or unable) to adapt, we predicted a positive link between the process of mutual adaptation and the successful implementation of a new technical system. During development and initial implementation, the two differentiated (Lawrence & Lorsch, 1967) groups, developers and users, have the opportunity to create knowledge by jointly exploring the full potential of a new system. Mutual adaptation can push both the new technical system and the work process to new heights of performance. Hence,

Hypothesis 4: A technical system's adaptation during its initial implementation will be positively associated with user satisfaction.

Hypothesis 5: Workplace adaptation during the initial implementation of a new technical system will be positively associated with user satisfaction.

User involvement. Involving users in new product development is beneficial for two reasons (Hayes, Wheelwright, & Clark, 1988). First, the quality of the product or process being developed may be improved by incorporating users' "mental schemas" (Boland, 1978) and their specialized knowledge of needs and preferences (von Hippel, 1988). Second, research on participation in organizational change (Coch & French, 1948) suggests that users will be more receptive to a new system if they contribute to its design. Empirical tests of the relationship between user involvement and success, however, have been of uneven quality, leading to the criticism that "the benefits of user involvement have not been convincingly demonstrated" (Ives & Olson, 1984: 586). Recent work suggests that the relationship may not be monotonically rising: more user involvement may not necessarily be better. Users may not always want to be involved (Doll & Torkzadeh, 1989). Heavy involvement may be appropriate only when uncertainty is high (Gales & Mansour-Cole, 1991) or when an innovation is not radical (Ettlie, 1986). Reflecting the current confused state of theory about user involvement and satisfaction, we posed the following research question, recognizing that both the

measurement and analysis of this variable would be complex and expecting our field work to add knowledge to the debate: What is the relationship of user involvement during development to user satisfaction?

METHODS

Setting and Respondents

A study of 34 software projects developed in four multibillion-dollar electronics companies was conducted. We derived data from personal interviews with the managers of the software development teams and the managers of the subunits receiving the new technical systems, using both structured questionnaires and open-ended questions. When projects had multiple user groups, we interviewed the manager of the group that received the new tool first and was the most likely to have been involved in its design. We constructed extensive, in-depth case histories from the questionnaire responses, interviews, and archival sources.

Measurements

User satisfaction. Our dependent variable, user satisfaction, was defined along three dimensions obtained through factor analysis with varimax rotation. The first dimension, impact on efficiency, measured user assessment of system benefits based on three criteria of system productivity, namely, output cost per unit, throughput time, and accuracy (-3 = very negative impact, $+3$ = very positive impact; $\alpha = .8$). The second dimension, smoothness of technology transfer, measured user evaluations of the process of technology transfer on a single-item scale (1 = very rough, 7 = smoother than most). Qualitative measures provided validating data. The third dimension, fulfillment of objectives, measured on three Likert-like scales ($\alpha = .6$) the degree to which a system met (1) users' overall expectations (1 = fell very short of satisfying, 5 = highly satisfied), (2) organizational change objectives (1 = totally failed to meet, 6 = surpassed objectives), and (3) business and financial objectives (same scale as preceding). Data for all the user satisfaction measures were based on the responses of the user managers.

Primary characteristics. The two primary characteristics of a new system, its technical performance and cost effectiveness, were based upon the responses of the developers. The degree to which the software system met its technical objectives was rated on a six-point scale (1 = totally failed to meet, 6 = surpassed all objectives). The developers then described the budgetary objectives of a project and rated how well the software project matched its budget on a five-point scale (1 = very much over, 5 = very much under).

Secondary characteristic. We measured fit at the time a system was first tested at the user site (the pilot test). At this point, a system design is complete; the developers have already addressed any known bugs or obvious performance shortfalls revealed by testing the prototype. Therefore, we measured fit before the fine-tuning of the mutual adaptation process. Our mea-

sure of fit was based on the user managers' responses to four items ($\alpha = .75$) on a seven-point scale (1 = immediate good fit, no problems, 7 = very poor fit, lots of problems). The items assessed users' perceptions of the degree to which the system fit their operations at this point in terms of: (1) their skills, (2) the system's performance (relative to users' equipment), (3) its functionality for task performance, and (4) its overall fit with organizational needs.

Mutual adaptation. System adaptation was measured as the product of (1) a system's initial functionality, defined as the percentage of its ultimate functionality at the time of the pilot test, and (2) the change in its functionality between the pilot test and general release (deployment in routine work). The organizational adaptation was measured as the sum of five dichotomous items indicating (1) no change, (2) user retraining, (3) procedural changes, (4) reward system changes, and (5) equipment changes.

User involvement. Following Robey and Farrow (1982), we measured user involvement at three points in the development and implementation process anchored to a month and year corresponding to: (1) the first time the users saw a prototype of the system, (2) the first time users tested the system in their own environment (the pilot test), and (3) the first time the users employed the system in routine work (general release). The period between the pilot and general release constituted initial implementation. For projects with multiple user groups, the developer manager alone had information on the involvement of all user groups. The perceived involvement of the manager of the user group that was the first to use the software and therefore had the greatest chance to influence the design of the system was clearly important. We therefore asked both the developer and the user managers to rate user involvement on a seven-point scale for the period preceding each of the three points (1 = no involvement, 7 = partner in the development of system).

Thus, we had six values reflecting user involvement at three points as perceived by two respondents. Addition of these values yielded a continuous measure with an alpha of .8, but our analysis revealed that there was no linear association between this measure and any of the user satisfaction dimensions. Our field data, however, indicated that projects in which users had been more involved were also those in which they had been more satisfied. We reasoned that since the design of a new technology is increasingly less susceptible to basic change as the development process proceeds (Clark, 1985; Leonard-Barton, 1988), the timing of user involvement, whether it is early or late in development, may be important in predicting user satisfaction. Although the continuous measure of involvement discriminated among projects in which user involvement had remained relatively constant at a low, medium, or high level throughout, it could not discriminate between, say, a project with medium involvement throughout and another with low involvement in early stages followed by high involvement in later stages. Summation of the user involvement ratings for the three stages of projects thus resulted in the loss of vital information about the dynamics of user involvement over time.

To capture the dynamic evolution of involvement during the projects, we grouped cases with similar temporal patterns of user involvement together using multidimensional scaling (MDS) to obtain a two-dimensional solution from the analysis of the proximity data computed from the six involvement scores. One of the dimensions could clearly be labeled involvement in the early stages of the project and the other involvement in the later stages. The MDS solution exhibited four clusters in terms of levels and variations in user involvement over the duration of the projects: low-low (low involvement early followed by low involvement later), medium-medium, low-high, and high-high. We collapsed the low-low and medium-medium projects into one category since these projects never showed high user involvement during their entire lives. Projects with high involvement during part of their lives and those with high involvement throughout constituted two other categories. The three project categories exhibited statistically significant differences along the user satisfaction dimensions. These three distinct temporal patterns of user involvement provided us with a categorical measure that not only reflected the degree of total user involvement in the projects but also its evolution over time. A description of the three clusters follows. Table 1 shows variable means for the clusters.

(1) Consultancy projects had either low-low or medium-medium involvements. In this cluster of 18 projects, 7 exhibited low user involvement during both the early and the later stages. The other 11 projects exhibited a moderate level of user involvement throughout their lives. (2) Lagged code-development, the low-high cluster, contained 4 projects; all began with low levels of user involvement that dramatically increased in later project stages. (3) The 12 codevelopment (high-high) projects were characterized by the users' deep involvement from the beginning of the projects to the end in highly creative, rather than merely reactive, roles.

RESULTS

Table 2 gives the correlations for all variables.

Table 3 shows results from three linear multiple regression models with the three user satisfaction variables as dependent variables. We used two dummy variables to represent the three temporal patterns of involvement. The regression coefficient of the third pattern of involvement was estimated as the negative sum of the coefficients for the other two categories. In view of the small number of cases ($N = 34$) and the exploratory nature of our study, we used $p \leq .10$ as the cutoff for support of the hypotheses. The F s for two of the three regression models (model 1 for efficiency and model 2 for smoothness) were significant at $p < .05$. The F for the third regression equation (model 3, objectives) was significant at $p < .10$. With an average R^2 of about .40, the three linear regression models explained about 40 percent of the variance in each of the user satisfaction variables.

The independent variables are not uniform in their predictive power across the three regression models, but only one significant beta, the coeffi-

TABLE 1
Descriptive Statistics for Three Types of Projects^a

Variables	Consultancy		Lagged Codevelopment		Codevelopment		Overall	
	Means	s.d.	Means	s.d.	Means	s.d.	Means	s.d.
User involvement								
Prototype stage, developer reports	2.72	1.95	1.25	0.50	6.33	0.89	3.82	2.46
Prototype stage, user reports	2.94	1.81	3.50	3.00	5.49	1.46	3.91	2.28
Pilot stage, developer reports	4.44	1.55	1.75	0.96	6.40	0.71	4.82	1.99
Pilot stage, user reports	3.56	1.15	7.00	0.00	6.41	0.68	4.97	2.01
General release, developer reports	4.66	1.26	5.75	2.50	6.37	1.03	5.39	1.66
General release, user reports	4.25	1.38	7.00	0.00	6.53	0.74	5.38	1.95
Fulfillment of objectives	7.51	2.97	6.06	3.22	8.60	2.45	7.73	2.98
Smoothness of implementation	4.63	1.33	5.53	1.28	5.67	1.23	5.10	1.36
Impact on efficiency	4.09	3.35	6.25	2.22	5.58	3.48	4.87	3.33
Fit	16.40	4.59	20.43	5.27	14.41	4.02	16.06	4.74
Technical performance	4.89	0.67	5.50	0.58	4.92	0.67	4.97	0.67
Cost effectiveness	3.06	0.41	3.00	0.00	2.92	0.29	3.00	0.35
System adaptation	878	943	1,229	176	640	992	906	897
Organizational adaptation	0.83	0.99	0.25	0.50	1.25	1.29	0.91	1.11

^a Overall $N = 34$; for consultancy, $N = 18$; for lagged codevelopment, $N = 4$; and for codevelopment, $N = 12$.

cient for lagged codevelopment in model 3, is in an unexpected direction. In model 1, the beta coefficients of technical performance and system adaptation were significant at $p < .05$, and that of organizational adaptation was significant at $p < .01$, indicating some support for Hypotheses 1, 4, and 5. The statistical significance of model 2 also implies that the large beta coefficient of cost effectiveness in this model, which is positive and significant at $p < .01$, can be considered support for Hypothesis 2. In model 2, the beta coefficient of the dummy variable for the consultancy projects, which had the lowest level of involvement, was negative and significant, suggesting that the relationship of user involvement to the smoothness of implementation is positive.

Although the beta coefficient of the variable assessing fit was statistically significant at $p < .05$ in model 3, the overall F for this model was significant only at $p < .10$. The regression analysis provides only weak support for Hypothesis 3. Model 3 also suggests a possible nonlinear relationship between user involvement and user satisfaction. In this model, the

TABLE 2
Correlations Among Variables^a

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
User involvement													
1. Prototype stage, developer reports													
2. Prototype stage, user reports	.32*												
3. Pilot stage, developer reports	.58***	.28											
4. Pilot stage, user reports	.30*	.66**	.18										
5. General release, developer reports	.30*	.41**	.42**	.41**									
6. General release, user reports	.16	.52**	.14	.75***	.47**								
User satisfaction													
7. Fulfillment of objectives	.24	.30*	.34*	.07	.25	.21							
8. Smoothness of implementation	.25	.00	-.01	.20	.10	.34*	-.02						
9. Impact on efficiency	.01	-.05	.02	.08	.01	.21	.31*	.03					
Fit													
10. Fit	-.10	-.14	-.22	-.05	-.19	-.06	.32*	.10	.23				
System quality													
11. Technical performance	.00	-.04	-.11	.11	.03	-.03	.28	.07	.27	.28			
12. Cost effectiveness	-.14	-.27	-.13	-.30*	-.05	.04	.02	.45**	.03	.11	.13		
Mutual adaptation													
13. System adaptation	-.04	.07	-.03	.04	.14	.29*	.15	.08	.30*	.18	-.09	-.06	
14. Organizational adaptation	.28	-.02	.31*	.09	.28	.16	.14	.06	.28	-.33*	-.29*	-.08	-.13

^a N = 34.

* p < .05

** p < .01

*** p < .001

TABLE 3
Results of Regression Analyses^a

Model Measure	User Satisfaction	Technical Performance			Cost Effectiveness			System Adaptation			Organizational Adaptation			Consultancy			Lagged Codevelopment			Multiple R			Adjusted R ²			F (df)		
		β			β			β			β			β			β			R			R ²			R ²		
		t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t
1 Impact on efficiency		0.37	2.17*		0.02	0.15	0.21	1.30	0.35	2.12*	0.51	3.06**		-0.10	-0.46	0.09	0.37	-0.01	-0.06	0.65	0.42	0.26	2.66*					(7, 26)
2 Smoothness of implementation		-0.06	-0.34		0.54	3.51**	0.07	0.41	-0.03	-0.16	0.06	0.33		-0.42	-2.58*	0.16	0.63	0.26	1.60	0.65	0.42	0.27	2.77*					(7, 26)
3 Fulfillment of objectives		0.38	2.20*		-0.02	-0.12	0.37	2.14*	0.19	1.11	0.30	1.74†		0.10	1.21	-0.53	-2.22*	0.43	1.83†	0.62	0.38	0.22	2.30†					(7, 26)

* N = 34.

^b Consultancy projects exhibited consistently low or medium user involvement during the early and later stages. Lagged codevelopment projects had low early and high later user involvement. Codevelopment projects had consistently high user involvement.

^c Values are estimated as the negative of the sum of the coefficients for consultancy and lagged codevelopment.

† p < .10

* p < .05

** p < .01

beta coefficient for the dummy variable for lagged codevelopment projects was negative and significant at $p < .05$. But these projects had higher levels of involvement overall than the consultancy projects. Thus, the higher user involvement in the four lagged codevelopment projects was associated with lower fulfillment of objectives. Since the F for this model was only weakly significant, the nonlinearity in the relationship between involvement and satisfaction may appear relatively minor and uninteresting. However, the case-based data, discussed in the next section, suggest underlying processes accounting for the negative relationship between involvement and the satisfaction of objectives among the four lagged codevelopment projects, the potential importance of which is not fully reflected in the statistical tests.

DISCUSSION

The primary and secondary characteristics of a technical system are indeed important to user satisfaction with implementation of internally developed technologies, but so are processes of technology transfer—user involvement and mutual adaptation. Prior research has not given these processes nearly the attention that primary and secondary innovation characteristics have received, perhaps because most of the literature on innovations has focused outside the boundaries of firms, where technology developers and users may interact through arm's-length market research, if at all, during the development of innovations. In the case of technology transfer inside a firm, the interaction of developers and users is not only possible, but may also be critical to success, since the technology is being developed for an internal, customized market. If internal developers fail to satisfy internal users, they do not usually have recourse to alternative markets for their products.

Not surprisingly, technical performance was strongly associated with a measure of transfer outcome, impact on efficiency, rather than with a transfer process. Our second technological primary characteristic was the degree to which a system was delivered as promised, within budget. A project that is more costly than anticipated is likely to satisfy users less, not only because returns on their financial investment in development are insufficient, but also because budget overruns imply problems in the development process. Model 2 shows a strong relationship between cost effectiveness and the smoothness of transfer, indicating that in projects with cost overruns, users are likely to perceive transfer less smooth.

Our hypothesis relating to user-perceived compatibility, or fit, received little support from our data. Although initial fit apparently helps meet original project objectives, fit was unrelated to either the smoothness of transfer or impact on efficiency. Since a close initial fit might be expected to auger less work and therefore a smoother transfer, this finding may appear counterintuitive at first. The following explanation may account for this result: in our model, smoothness measured user satisfaction with the process of technology transfer that, as we will discuss below, was enhanced by user in-

volvement in the projects. But a close initial fit in a project generated lower user involvement than did poorer fit; hence, the lack of a significant association between fit and the smoothness of implementation. It is notable that fit and organizational adaptation also are negatively correlated. A close initial match between a system and users' requirements reduced the perceived need for organizational changes, thus depriving users of the potential benefit to efficiency that a process of organizational adaptation could create. Thus, a high degree of initial compatibility between a new system and a user workplace may be a mixed blessing, if the system implementation produces no opportunity to reengineer the workplace and no opportunity for mutual adaptation.

Mutual adaptation is the refinement of a system to fit the particular needs of a user group and the redesign of the users' work process to take advantage of the new system. Such commitment to cooperative innovation at the point of initial use is often overlooked because there is a tendency to believe that development is over by then and no further creative effort is required. Our findings suggest, however, that attaining productivity increases may be less related to how well a system initially fits a user environment than to how well developers and users make alterations to achieve these desired benefits. For example, one of the most highly successful systems that we studied had originally been designed to communicate through a network but was ultimately altered to be "hard-wired" into a mainframe computer (a system adaptation), thus speeding up and easing user access. Users learned to produce their own reports on the new system, thus changing work procedures (an organizational adaptation).

Our study did not reveal a linear, monotonically positive relationship between user involvement and user satisfaction—a finding that was not entirely unexpected, given the equivocality of previous research on this construct (Ives & Olson, 1984). In our data, that relationship was better characterized by different temporal patterns as well as different levels of user involvement. The consultancy projects, in which users and developers had an arm's-length relationship at best, exhibited significantly lower mean user satisfaction scores ($p < .05$) than the other projects for smoothness of implementation (Table 3), and the beta coefficient of the dummy variable for these projects in the regression equation for smoothness was significantly negative (Table 3). Although extensive user involvement does not necessarily predict user satisfaction, our findings suggest that very low levels are associated with dissatisfaction. Projects in which developers assumed they could proceed without direct user involvement were perceived as significantly less smooth.

Our interview data help us interpret this finding. The accessibility and responsiveness of developers to problems, as well as whether the implementation itself was actually problem-free, seemed to influence users' perceptions of implementation smoothness. Quick responses to problems lessened their significance and reduced their potential to disrupt operations; hence, implementation was perceived as smooth. So, for instance, we saw an im-

plementation rated as average when the developer sent a tape to users and interacted frequently by telephone with them to resolve implementation issues. Implementation of a similar system was rated as extremely smooth when the developer arrived on a plane, tape in hand, and worked face-to-face with users during installation—even though, in both situations, some problems occurred. In cases of rough implementation, the developer was more likely to be both physically distant and unresponsive, conditions conducive to low interaction. Hence, the negative beta weight for consultancy projects in model 1 (Table 3) indicates not only a lower level of interaction, but also greater psychological distance in the interaction. This distance indicates developer (and sometimes user) beliefs about the need for user input.

The lagged codevelopment projects began with low levels of involvement in the early stages that increased dramatically to high levels in the later stages. Overall, these projects experienced higher average user involvement during their lives than the consultancy projects, yet the former had lower ratings on fulfillment of objectives, a pattern giving rise to the nonlinearity in the relationship between user involvement and user satisfaction in our data. A closer look at the history of these projects provided more insight into the dynamics underlying this particular pattern of evolution of user involvement.

Each of these projects started life in the laboratory, usually as the invention of a researcher who had no particular application in mind but was solving an intellectual puzzle; hence, the low involvement in the early stages. When developer and users discovered each other almost by chance, there was a burst of euphoria as both sides perceived an initial fit—the users relieved to find a mostly developed tool to solve a critical problem in their work, the developer seeing the potential for real life use of his or her concepts. The intense user involvement in the later stages of these projects was almost exclusively for the purpose of quickly modifying the system. In essence, these systems had been grabbed off the shelf by users with an immediate need, who were able to custom-fit the systems to pressing production requirements without investing in organizational adaptation. Even with late user involvement and little organizational adaptation, such projects improved work processes because of the serendipitous fit. But the projects failed to meet all original objectives and were not particularly smooth. For instance, an artificial intelligence environment designed in and for a research laboratory ended up on the critical path for delivering a new, highly complex computer to the market when design engineers perceived it as a means for quickly developing a necessary software package. The software developers, who had never intended to deliver a system for routine use, altered their design to meet the users' special needs. The users, whose goals were clear and urgent, could not alter their work practices. In these cases, both developers and users commented on how naive they had been about the difficulties involved in transforming a laboratory tool into one for production. Users commented that their "management didn't know what they were getting into . . . their expectations were very high" and that "the people in

charge knew nothing about software." The researchers thrust into the role of developers noted wryly that the project "certainly made us appreciate that we are not a development division."

The codevelopment projects, in which user involvement was at a high level throughout, exhibited significantly higher ($p < .01$) mean user satisfaction ratings than other projects on the fulfillment of objectives (Table 1), and the beta coefficient of the dummy variable for these projects in the regression equation for objectives was positive (Table 3), albeit at a lower level of significance ($p = .10$). Why did low involvement predict user evaluations of the process (smoothness) but consistently high involvement did not? High involvement predicted only one of the three dimensions, objectives, and that one only weakly. The codevelopment projects tended to be excursions into new territory for both developers and users. Both parties interacted continuously and at a high level because they were inventing together a totally new combination of technical system and work processes using that new system. Consequently, there was often uncertainty about both objectives and how to achieve those objectives. In some cases, the original objectives were not reached, yet the system succeeded along some dimension not anticipated in the original plans. For instance, one system identified and diagnosed problems in manufacturing circuit boards so well that it worked itself out of a job; after it had been in use for a year, the problems it was designed to catch were all being prevented before the boards reached that point in the manufacturing process. However beneficial the outcome, eliminating the problems was not the original objective. Moreover, the constant high level of interaction in such projects usually involved much debate and sometimes intense negotiation; therefore, although lack of involvement appeared to result in perceived roughness of transfer, the occurrence of involvement did not appear to ensure a smooth transfer.

The weak relationship between codevelopment and impact on efficiency in our data is perhaps a result of the presence of the two mutual adaptation variables in our model, both of which correlate highly with involvement and are significant predictors of efficiency. Our data therefore appear to suggest that user involvement per se does not result in the realization of system benefits. It is the accommodation of mutual needs and opportunities for useful change identified during user involvement that are important. Although user involvement may be necessary for an organization to avail itself of the benefits of mutual adaptation, very high levels of user involvement can lead to a dysfunctional asymmetric relationship, with excessive user influence over a design perhaps resulting in a new system's automating history—capturing in software or equipment a current process that is comfortable and familiar to users, but already on its way to becoming outdated. For instance, a group of users pushed developers to match current work practices exactly, so that no user investment in new skills, different reward structures, or other organizational changes was required. However, these users were too close to the operations on the factory floor and inadequately aware of plans for future operational changes in the plant. The sys-

tem designed tracked work in process admirably, but within a couple of months the plant switched to a "just-in-time" inventory system that required elimination (rather than monitoring) of inventory. Therefore, one reason for the mixed results in past studies of the relationship between user involvement and satisfaction might have been the omission of mutual adaptation as a predictor. Studies reporting a positive relationship might have captured the effect of adaptation as well as that of involvement; those reporting a negative relationship might have captured the effect of involvement without mutual adaptation.

CONCLUSION

Past studies have shown that managers equate good implementation with the execution of careful plans rather than with the process of experimental discovery that can alleviate many initial problems. They therefore underestimate the effort required and allocate inadequate resources both for system changes and for user organization transformation, which limits their ability to benefit from the system. Managing the processes of mutual adaptation and user involvement requires changing the managerial perspective on implementation from a reactive to a proactive one. Our empirical observations suggest that attention to controlling budget and involving users is more likely to ensure favorable evaluations of a transfer process, whereas attention to high-quality technical performance along with provisions for mutual adaptation is more likely to result in improved production output. The initial fit of the technology with the user environment may be less important to ultimate user satisfaction. A good fit with the status quo may imply automation of outdated processes and forestall beneficial adaptation.

REFERENCES

- Barley, S. R. 1986. Technology as an occasion for structuring: Evidence from observations of CT scanners and the social order of radiology departments. *Administrative Science Quarterly*, 31: 78-108.
- Boland, R. J. 1978. The process and product of system design. *Management Science*, 24: 887-898.
- Child, J., Ganter, H., & Kieser, A. 1987. Technological innovation and organizational conservatism. In J. M. Pennings & A. Buitendam (Eds.), *New technology as organizational innovation*: 87-115. Cambridge, MA: Ballinger.
- Clark, K. B. 1985. The interaction of design hierarchies and market concepts in technological evolution. *Research Policy*, 14: 235-251.
- Coch, L., & French, J. R. 1948. Overcoming resistance to change. *Human Relations*, 1: 512-532.
- Doll, W. J., & Torkzadeh, G. 1989. A discrepancy model of end-user computing involvement. *Management Science*, 35: 1151-1171.
- Downs, G. W., & Mohr, L. B. 1976. Conceptual issues in the study of innovations. *Administrative Science Quarterly*, 21: 700-714.
- Ettlie, J. 1986. Implementing manufacturing technologies: Lessons from experience. In D. Davis & associates (Eds.), *Managing technological innovation*: 72-104. San Francisco: Jossey-Bass.

- Gales, L., & Mansour-Cole, D. 1991. User involvement in innovation projects: A reassessment using information processing. In J. Wall & L. Jauch (Eds.), *Academy of Management Best Papers Proceedings*: 347-351.
- Hayes, R. H., Wheelwright, S. C., & Clark, K. B. 1988. *Dynamic manufacturing*. New York: Free Press.
- Ives, B., & Olson, M. H. 1984. User involvement and MIS success: A review of research. *Management Science*, 30: 586-603.
- Johnson, B., & Rice, R. 1987. *Managing organizational innovation: The evolution from word processing to office information systems*. New York: Columbia University Press.
- Kimberly, J. R. 1981. Managerial innovation. In P. Nystrom & W. Starbuck (Eds.), *Handbook of organizational design*, vol. 1: 84-104. London: Oxford University Press.
- Lawrence, P. R., & Lorsch, J. W. 1967. *Organization and environment*. Boston: Harvard Business School Press.
- Leonard-Barton, D. 1988. Implementation as mutual adaptation of technology and organization. *Research Policy*, 17: 251-267.
- Porter, M. 1985. *Competitive advantage*. New York: Free Press.
- Powers, R. F., & Dickson, C. W. 1973. MIS project management: Myths, opinions and reality. *California Management Review*, 15: 147-156.
- Rice, R. E., & Rogers, E. 1980. Reinvention in the innovation process. *Knowledge*, 1: 499-514.
- Robey, D., & Farrow, D. 1982. User involvement in information system development: A conflict model and empirical test. *Management Science*, 28: 73-85.
- Rogers, E. M. 1983. *Diffusion of innovations*. New York: Free Press.
- Souder, W. 1987. *Managing new product innovations*. Lexington, MA: Heath.
- Tornatzky, L. G., & Klein, K. 1982. Innovation characteristics and innovation adoption-implementation: A meta-analysis of findings. *IEEE Transactions and Engineering Management*, EM-29(1): 28-45.
- von Hippel, E. 1988. *The sources of innovation*. New York: Oxford University Press.
- Weick, K. E. 1990. Technology as equivocal: Sensemaking in new technologies. In P. Goodman, L. Sproull, & associates, *Technology and organization*: 1-44. San Francisco: Jossey-Bass.
- Zuboff, S. 1982. New worlds of computer-mediated work. *Harvard Business Review*, 60(5): 142-152.

Dorothy Leonard-Barton (Ph.D., Stanford University) is a professor at Harvard Business School. Her research focuses on the transfer of knowledge across organizational, cultural, and subcultural boundaries during new product and process development.

Deepak K. Sinha (Ph.D., Massachusetts Institute of Technology) is an assistant professor at the Krannert Graduate School of Management, Purdue University. His research interests include corporate strategy, cost reducing investment, and evolution of output.

ORGANIZATIONAL COMMITMENT AND TURNOVER: A META-ANALYSIS

AARON COHEN
University of Haifa

This meta-analysis examines whether differences in the lengths of time elapsed between the measurement of organizational commitment and departure interact with the career stages of employees in moderating the commitment-turnover relationship. For younger employees, the shorter the time separating the measurement of organizational commitment and the occurrence of departure, the stronger the correlations. The findings also show that the commitment measure used strongly affects the magnitude of the relationship. The findings are discussed in terms of their implications for future research.

Most attention given to the concept of organizational commitment results from its relationship with turnover. By definition, highly committed employees wish to remain with their employing organizations (Mowday, Porter, & Steers, 1982). However, quantitative summaries of findings (Mathieu & Zajac, 1990; Randall, 1990), have demonstrated that the relationships between organizational commitment and turnover have produced few large correlations. One explanation for the low commitment-turnover correlations is that other variables probably moderate this relationship (Mathieu & Zajac, 1990), but little research has addressed that issue. Wiener and Vardi (1980) found that type of occupation had some effect on the commitment-turnover relationship. Werbel and Gould (1984) revealed an inverse relationship between organizational commitment and turnover for nurses employed more than one year, but my previous work (Cohen, 1991) has indicated that this relationship was stronger for employees in their early career stages (i.e., up to 30 years old) than those in later career stages. In two studies (Mathieu & Zajac, 1990; Randall, 1990), the findings showed that methodological factors, such as research design, operational definition of organizational commitment, sample selection, and observation technique, failed to account for a large proportion of the variance in the commitment-work outcomes relationship.

The purpose of this meta-analysis was to examine the moderating effect of the interval between the measurement of an individual's organizational commitment and the occurrence of organizational departure upon the rela-

Thanks to Brian Prat, Catherine Kirchmeyer, and the three anonymous reviewers for this journal for their helpful comments and suggestions. I would also like to thank Betty Siegler, Suzanne Klely, and Marion Lupu for their editorial assistance.

relationship between those variables. The expectation that the relationship would vary over different time spans was based on the argument that the shorter the time separating the measurement of an intention and the occurrence of a criterion behavior, the more accurate will be the prediction (Price & Mueller, 1981). The time variable is part of the criterion problem to the extent that different studies have measured turnover over different lengths of time. Mobley, Griffeth, Hand, and Meglino (1979) argued that the effect of differences in the lengths of time between the measurement of independent variables and organizational departure appeared to be a topic in need of additional research. Controlling the commitment-turnover relationship by the time variable might show that this relationship is stronger than has previously been found and might clarify the importance of organizational commitment as a predictor of turnover.

THEORETICAL BACKGROUND AND HYPOTHESES

Porter, Crampon, and Smith (1976), who compared stayers and leavers at three time points, each of which was prior to a set of leavers terminating, found that leavers who were a month and a half or less away from actually terminating reported significantly less commitment than stayers. When leavers were 2 to 3.5 months from actually terminating, they showed less commitment than equivalent stayers, but the difference was not significant. If eventual leavers were at least 6 months away from terminating, their commitment was almost the same as that of equivalent stayers. The findings of Porter and colleagues (1976) indicate that even though organizational commitment appears to be "somewhat more stable over time than job satisfaction" (Mowday et al., 1982: 28), decline in this attitude can be very rapid. If, for example, two employees report high levels of commitment at a given time, the prediction for both of them is that they will remain in their employing organization. If turnover data were collected one year later, and if decline in the level of organizational commitment occurred for one of them 2 months after its measurement and resulted in his or her leaving the organization, this observation would contradict the prediction and reduce its accuracy. The decline in organizational commitment would not have been captured because of the long interval between the measurement of the attitude and the collection of the turnover data. The longer this interval, the higher the probability that additional events in an organization will cause more employees to change their level of organizational commitment, which may increase the errors in prediction and lower the commitment-turnover relationship.

Hypothesis 1: The relationship between organizational commitment and turnover will be stronger the shorter the time elapsed between the measurement of the two variables.

What may determine the magnitude of the effect of time upon the commitment-turnover relationship is (1) the probability that a decline in organ-

izational commitment will occur, and (2) the rapidity and intensity of this decline. If the probability of a decline in employees' organizational commitment is high and the process from decline to their leaving an organization is rapid, more employees who reported high levels of commitment at the time of an attitude survey and who were expected to remain in the organization might leave before turnover data could be collected; this set of circumstances would reduce the accuracy of prediction.

In undertaking this research, I expected the probability and intensity of decline to differ across career stages. Early in individuals' careers, their levels of organizational commitment vary because of their differing propensities to become committed to an employing organization (Mowday et al., 1982); commitment level could also depend on an individual's opportunities and the availability of attractive alternatives (Mowday, Koberg, & McArthur, 1984). The effect of time upon the commitment-turnover relationship will be strong for these employees: the instability in their organizational commitment will result for many of them in rapid changes in its level over relatively short time spans. These changes will not be captured over long time intervals between the measurement of commitment and the collection of turnover data and will cause errors in turnover predictions based on commitment levels at the times of the surveys. Consequently, the shorter the measurement interval, the more accurate the prediction will be. Employees in later career stages are more oriented than new employees to settling down in an organization and are less willing to relocate or to leave the organization to achieve a promotion. For them, organizational commitment levels are more stable because of structural and behavioral bonds with the organization, a stronger need for stability, and increased difficulties in finding opportunities elsewhere (Levinson, Darrow, Klein, Levinson, & McKee, 1978; Super, 1957). These considerations will also increase the length of time for their job search and will result in a slow process from decline in commitment to actual departure. For such employees, fewer drastic changes of the kind that may cause errors in prediction are expected, and the measurement interval will not affect this relationship for them as it does for those in an early career stage.

Hypothesis 2: For new employees, the relationship between organizational commitment and turnover will be stronger the shorter the interval between the measurement of commitment and the collection of turnover data. For employees in later career stages, the measurement interval will not affect the magnitude of the relationship.

METHODS

Studies that contained correlational data dealing with the relationship between organizational commitment and turnover published between 1967 and 1991 were identified by means of both manual and computer-assisted searches of the social science, psychology, and management literatures. The

computer search scanned two data bases, *psycINFO* and *ABI/INFORM*. The manual search was based on scanning the reference lists of the two previous meta-analyses concerned with the focal relationship (Mathieu & Zajac, 1990; Randall, 1990) and on an article-by-article search performed for 24 organizational behavior, psychological, and sociological journals. Table 1 lists the 34 studies found, which represented 36 independent samples.

This study used the Hunter and Schmidt (1990) meta-analytic procedure, which consists of three basic steps: estimation of the mean correlation and variance for a population; correction for statistical artifacts; and analysis of moderating effects. The statistical artifacts controlled for in this study were sampling error and predictor unreliability. For two samples, the reliability of organizational commitment was not reported, and I therefore used the average reliability across all samples that reported information.

Recent research on turnover (Kemery, Dunlap, & Griffeth, 1988; Steel, Shane, & Griffeth, 1990; Williams, 1990) has dealt with the question of whether and how turnover correlations should be adjusted for inopportune splits in the dichotomous variable whenever turnover deviates from 50 percent. Williams (1990) argued that analysts should correct for artifactual dichotomization when a dichotomous variable is assumed to represent a continuous theoretical construct, such as employee tenure. However, "unlike with tenure, there is a perfect correspondence between the dichotomous turnover construct and the dichotomous operational measure of turnover" (Williams, 1990: 732). Therefore, turnover correlations need not be corrected for dichotomization but for unequal sample sizes, a correction allowing estimation of what the maximum correlation would be if there had been a 50-50 split in the distribution of the dichotomous variable. On the basis of empirical comparison of three correction formulas, Williams concluded that

TABLE 1
Studies Used in the Meta-analysis

Abelson	1983	Marsh & Mannari	1977
Arnold & Feldman	1982	Mayes & Ganster	1988
Blau	1989	Michaels & Spector	1982
Blau & Boal	1987	Miller et al.	1990
Blegen et al.	1988	Mowday et al.	1979
Clegg	1983	Mowday et al.	1984
Colarelli et al.	1987	O'Reilly & Caldwell	1981
Decotiis & Summers	1987	O'Reilly & Chatman	1986
Farris & Aranya	1983	Parasuraman	1982
Fisher	1985	Parasuraman & Alutto	1984
Hollenbeck	1989	Pierce & Dunham	1987
Hollenbeck & Williams	1986	Porter et al.	1974
Hom & Hulin	1981	Porter et al.	1976
Hom et al.	1979	Steers	1977
Husfield & Day	1991	Stumpf & Hartman	1984
Kinicki et al.	1990	Werbøl & Gould	1984
Lee & Mowday	1987	Wunder et al.	1982

correction for unequal samples is best accomplished by using the following formula offered by Kemery and colleagues (1988): $\text{corrected } r = .7978 \times r \times (pq)^{1/2}/h$, where r is the observed correlation between organizational commitment, the continuous variable, and turnover, the truly dichotomous variable; p is the proportion of cases in either dichotomous category; q is $(1 - p)$; and h is the ordinate of the unit normal distribution at p . Information for proportion of leavers was available in 31 out of the 36 samples studied here. In the remaining five samples, I corrected the correlations by using the mean of the proportion of leavers in the 31 samples as the value for p .

To define the time frames of turnover measurement, I divided the samples studied into those in which turnover data were collected up to and including six months after organizational commitment was measured and those that reported collecting turnover data more than six months after the measurement of commitment. This categorization is based on the findings of Porter and colleagues (1976) reported earlier. For 3 of the 36 samples, there was no report of the interval of concern. There is ambiguity and inconsistency in the literature regarding the use of age, tenure, or both as career indicators because different measurements of career stage result in different patterns of affective reactions (Morrow & McElroy, 1987). In addition, in previous research (Cohen, 1991), I found a strong commitment-turnover relationship when age but not tenure was the career stage moderator and concluded that further research was needed to explore the differences between the two career indicators. The solution used in this study was to test both operational definitions. If the moderating effect of career stage differs according to which of the two indicators is used, it can be argued that age and tenure represent different moderation processes.

To study the first indicator, employee age, I divided the samples into two subgroups based on the mean age of the employees they represented (1) up to and including 30 years and (2) over 30 years. As in previous operational definitions of time frame based on age (Rush, Peacock, & Milkovich, 1980; Slocum & Cron, 1985), the first subgroup represented the early career stage, and the second, the middle and the later stages. The second indicator, organizational tenure, was also divided into two subgroups: (1) up to two years and (2) two years or more. Again, as in previous definitions of time frame based on tenure (Gould & Hawkins, 1978; Stumpf & Rabinowitz, 1981), the first subgroup represents the early career stage, and the second, the middle and later stages. I defined career stage using two subgroups because most often the differences across age and stage categories were between individuals beginning their early careers and individuals in all later stages (Cohen, 1991; Gould & Hawkins, 1978; Stumpf & Rabinowitz, 1981). Information about the mean age of respondents was provided in 24 of the 36 samples, and information on tenure in 26. The other samples were treated as missing values for the analyses.

Controlling the moderating effects of different measures of organizational commitment allowed for a comprehensive control of an important aspect of the commitment-turnover relationship and also for comparisons with two

previous meta-analyses (Mathieu & Zajac, 1990; Randall, 1990). Those two meta-analyses compared results based on the Organizational Commitment Questionnaire (OCQ) of Porter, Steers, Mowday, and Boulian (1974) to results based on other, non-OCQ attitudinal measures (Randall, 1990) or to results based on the continuance commitment measure developed by Ritzer and Trice (1969); it is known as the side-bet measure because it is conceptually based on the side-bet theory approach proposed by Becker (1969). However, one consideration not taken into account in the two previous meta-analyses was that the OCQ has two versions. O'Reilly and Chatman (1986) and Reichers (1985) criticized the original 15-item version because of the overlap of some items with the concept they are supposed to predict, turnover. This criticism has led some researchers to use a shorter version of the OCQ that omits the problematic items. This study therefore contains analyses (1) comparing the full and the shorter version of the OCQ and (2) comparing the side-bet measure to the non-OCQ attitudinal measures. Both the full OCQ and the side-bet measure include items that refer to turnover (Reichers, 1985), and they will be compared to the short version of the OCQ and the non-OCQ measures that do not include these items.

The procedure of Hunter and Schmidt (1990: Chapter 9) for detecting a moderator among binary variables was applied in this study. If a meta-analysis is based on only a small number of studies, there will be an error in the estimates of means and standard deviations that they termed second-order sampling error. They asserted that the observed difference between the means of the subgroup correlations may be due to this error and argued that the range of potential sampling error in each subgroup of studies can be estimated by computing a confidence interval for the mean correlation in each subgroup. They proposed a way to measure the extent of a confidence interval by computing a significance test on the difference between the two mean correlations. The formula for the significance test is: $z = C/\sqrt{\text{var}(c)}$, where C is the difference between the correlations and $\text{var}(c)$ is $S_1^2 + S_2^2$, where S_1^2 is the variance of observed effect sizes divided by the number of samples for the specific subgroup and S_2^2 is the same as S_1^2 for its subgroup.

Williams (1990) argued that conclusions regarding turnover relationships are valid and generalizable within particular combinations of conditions, rather than to any given correction of turnover correlations. One way of controlling for situational conditions is through the hierarchical breakdown of moderators in meta-analysis. This technique begins by grouping studies on the basis of one moderator variable, and then on the basis of the second, and so forth (Hunter & Schmidt, 1990; Williams, 1990). Studies within each cell are then meta-analyzed, and the pattern of effect sizes across cells examined. The interaction effect was examined here by dividing the total data set into four groups. Group 1 included samples in which turnover data were collected six months or less after organizational commitment data and the individuals studied were in the early career stage, indicated by average ages up to and including 30 years or average tenures up to and

including 2 years. Group 2 included samples in which turnover data were collected more than six months after commitment data and the individuals studied were again in the early career stage. Group 3 included samples in which turnover data were collected six months or less after organizational commitment data and the individuals studied were in later career stages, and group 4 represented a data collection interval of more than six months and late-career-stage individuals. Meta-analysis was conducted in each cell. To control for the type of commitment measurement used, I conducted additional meta-analyses in each cell. Two separate hierarchical analyses were performed: in the first, career stage was measured by age, and in the second, by tenure.

Although meta-analysis serves to illustrate the unique impact of each moderator of concern, it is difficult to assess a moderator's relative importance with the method. Thus, I performed a multiple regression analysis with each of the moderators regressed on the organizational commitment–turnover correlation coefficients (Randall, 1990). Hunter and Schmidt (1990) criticized the regression approach because of the high probability of “capitalization by chance.” As a researcher sorts through potential moderator variables, some study characteristics may have a high chance correlation with the sampling error. This variable then looks like a strong moderator. I therefore used the regression approach as a supplementary method for analyzing the data. In order to maintain consistency with the meta-analytic design that would allow comparison of the results of the two procedures, I analyzed time interval and career stage as dummy variables. In response to the argument about measuring age and tenure as ranges or as chronological indicators (Bedeian, Ferris, & Kacmar, 1992), I performed an additional regression analysis analyzing age and tenure as continuous variables. Commitment–turnover correlations were regressed onto time interval, career stage, and finally an interaction of age and tenure with time interval. A significant interaction would support the research hypothesis. I entered the type of organizational commitment measurement first, as a dummy and control variable. Finally, two separate regression analyses were performed: in the first, the career stage was operationally defined by age, and in the second, by tenure.

RESULTS

Table 2 shows results for two main effect analyses: the first included all 36 samples, and the second only the 33 samples in which information for the interval between the measurement of commitment and organizational departure was available. The moderator analysis controlled for the time frame of turnover measurement, career stage, and the measures of organizational commitment used.

As Hypothesis 1 predicts, the commitment–turnover relationship is stronger when the interval between the measurement of commitment and organizational departure is short. It is significantly stronger when the inter-

TABLE 2
Results of Meta-analysis^a

Variables	k	N	r	r _t	Confidence Interval	Observed Variance	Residual Variance	Variance Attributable to Statistical Artifacts	χ ²	Z
Turnover, total 1	36	10,596	-.24	-.23	-.43 to -.04	.0118	.0086	28%	138.21***	
Turnover, total 2	33	9,628	-.22	-.24	-.44 to -.03	.0126	.0092	26	133.34***	
Interval to turnover measurement										
Six months or less	8	1,239	-.33	-.35	-.75 to .04	.0399	.0345	13	62.01***	
More than six months	25	8,389	-.20	-.22	-.35 to -.09	.0066	.0036	44	60.44***	1.74*
Missing values	3	968	-.23	-.24	-.38 to -.10	.0075	.0047	37	8.02*	
Age										
30 years or less	11	1,806	-.33	-.35	-.63 to -.06	.0233	.0187	20	55.75***	
More than 30 years	13	3,453	-.21	-.23	-.37 to -.09	.0078	.0043	45	29.66**	2.15*
Missing values	12	5,237	-.18	-.20	-.29 to -.12	.0040	.0015	61	22.42*	
Tenure										
2 years or less	7	1,088	-.21	-.22	-.33 to -.11	.0085	.0026	69	10.14*	
More than 2 years	19	4,677	-.26	-.28	-.52 to -.04	.0163	.0127	22	87.43***	1.15
Missing values	10	4,831	-.18	-.20	-.33 to -.07	.0061	.0037	38	31.30***	
Commitment measures										
15-item OCQ	17	3,817	-.31	-.33	-.53 to -.13	.0129	.0092	29	60.06***	
9-item OCQ	12	4,350	-.18	-.19		.0026	.0000	100	12.01	3.17*
Non-OCQ measures	5	2,052	-.13	-.16	-.23 to -.09	.0036	.0001	91	6.39	
Side-bet measure	2	377	-.26	-.28		.0001	.0000	100	0.39	3.86*

* k = the number of samples in each analysis; N = the total number of individuals in the k samples; r = the mean weighted uncorrected correlation; and r_t = the mean weighted correlation corrected for attenuation. The confidence interval is 95 percent for r_t; the observed variance is the variance of the uncorrected correlations, and the residual variance is the latter corrected for statistical artifacts.

* p < .05

** p < .01

*** p < .001

val is six months or less ($r = -.35$) than when it is more than six months ($r = -.22$). The relationship is significantly stronger in the early career stage ($r = -.35$) than in the later stages ($r = -.23$) when age is the career stage indicator. There is no significant difference between the two career stages when tenure is the indicator. Finally, results also show a significantly stronger relationship between commitment and turnover when the former is measured by the full 15-item version of the OCQ ($r = -.33$) than by the shorter version ($r = -.19$). Also, the relationship was significantly stronger when the side-bet measure is used ($r = -.28$) than when other attitudinal non-OCQ measures are used ($r = -.16$). The moderator analysis shows a considerable increase in the percentage of variance across samples attributed to statistical artifacts in most of the subgroups.

Results of the hierarchical moderator analysis, shown in Table 3, partly support Hypothesis 2 when age is the career stage indicator. The commitment-turnover relationship is the strongest for the shorter interval between the measurement of the two variables among employees in the early career stage ($r = -.47$). For the longer interval, the relationship is lower not only among employees in the later career stages but also among employees in the early stage. The Hunter and Schmidt test (1990) reveals significant differences between group 1 and groups 2 ($z = 2.33, p < .05$) and 4 ($z = 2.97, p < .05$). The difference in the correlations between groups 3 and 4 was unexpected. Hypothesis 2 did not anticipate any effect of the time of measurement upon employees in the late career stages, but results show a low correlation in the shorter interval ($r = -.05$) and a higher correlation in the longer interval ($r = -.22$). It is important to note that the correlation in group 3 is based upon one sample; this result should therefore be interpreted cautiously. Although a large amount of variance remains unaccounted for by statistical artifacts when the samples are divided into the four groups, controlling each for organizational commitment measurement eliminates the unexplained variance, demonstrating strong homogeneity in the groups. Strong support for this homogeneity emerged in the results of the chi-square tests. In all four groups, the results of that test were not significant when commitment measures were controlled, showing a lack of support for the hypothesis of heterogeneity across sample correlations.

Results do not support Hypothesis 2 when tenure is the career stage indicator (Table 4). The commitment-turnover relationship is the strongest in the shorter interval between the measurement of the two variables, but among employees in the later career stages ($r = -.44$), not among those in the early career stage ($r = -.22$), as expected. In the longer intervals, the relationship between organizational commitment and turnover is lower among employees in both the early ($r = -.22$) and later stages ($r = -.25$). The Hunter and Schmidt test (1990) reveals significant differences only between group 3 and groups 1 ($z = 1.75, p < .05$), 2 ($z = 1.78, p < .05$), and 4 ($z = 1.70, p < .05$). Controlling each of the subgroups for measurement type eliminates much of the unexplained variance, demonstrating strong homogeneity in the groups. In addition, in all the groups except one (group

TABLE 3
Meta-analytic Results of Hierarchical Moderator Analysis for Age^a

Variables ^b	k	N	r	r _i	Confidence Interval	Observed Variance	Residual Variance	Variance Attributable to Statistical Artifacts	χ^2	Z
Age, total	22	4,980	-.25	-.27	-.51 to -.03	.0170	.0130	23%	96.29***	
Group 1, total	5	759	-.45	-.47	-.78 to -.16	.0271	.0228	16	32.15***	
15-item OCQ	3	543	-.53	-.57	-.85 to -.48	.0044	.0016	65	4.86	
9-item OCQ	2	216	-.24	-.25	-.38 to -.12	.0121	.0039	68	2.94	3.34*
Group 2 total	4	748	-.24	-.26	-.42 to -.10	.0107	.0060	44	9.10*	
15-item OCQ	3	436	-.32	-.34		.0021	.0000	100	1.14	
9-item OCQ	1	312	-.14							
Group 3, total	1	158	-.05							
Group 4, total	12	3,295	-.22	-.24	-.36 to -.12	.0067	.0033	50	24.45**	
15-item OCQ	3	1,192	-.30	-.32	-.34 to -.29	.0022	.0002	93	3.22	
9-item OCQ	4	1,074	-.16	-.18		.0010	.0000	100	1.18	4.46*
Non-OCQ measures	3	652	-.14	-.16		.0022	.0000	100	1.49	
Side-bet measure	2	377	-.26	-.28		.0001	.0000	100	0.39	4.29*

^a k = the number of samples in each analysis; N = the total number of individuals in the k samples; r = the mean weighted uncorrected correlation; and r_i = the mean weighted correlation corrected for attenuation. The confidence interval is 95 percent for r_i; the observed variance is the variance of the uncorrected correlations, and the residual variance is the latter corrected for statistical artifacts.

^b Group 1: six months or less in turnover measurement, and 30 years or less in age or 2 years or less in tenure; Group 2: more than six months in turnover measurement, and 30 years or less in age or 2 years or less in tenure; Group 3: six months or less in turnover measurement, and more than 30 years in age or 2 years in tenure; Group 4: more than six months in turnover measurement and more than 30 years in age or 2 years in tenure.

* p < .05

** p < .01

*** p < .001

TABLE 4
Meta-analytic Results of Hierarchical Moderator Analysis for Tenure^a

Variables ^b	k	N	r	r _i	Confidence Interval	Observed Variance	Residual Variance	Variance Attributable to Statistical Artifacts	χ^2	Z
Tenure, total	25	5,398	-.25	-.27	-.50 to -.04	.0162	.0121	28%	99.45***	
Group 1, total	3	348	-.20	-.22	-.29 to -.15	.0090	.0010	89	3.41	
15-item OCQ	2	270	-.23	-.26	-.38 to -.13	.0100	.0033	67	3.02	
9-item OCQ	1	78	-.10							
Group 2, total	4	740	-.20	-.22	-.34 to -.10	.0083	.0034	60	6.72	
15-item OCQ	3	428	-.26	-.28	-.38 to -.17	.0085	.0023	72	4.16	
9-item OCQ	1	312	-.14							
Group 3, total	4	779	-.41	-.44	-.86 to -.03	.0417	.0376	10	46.62***	
15-item OCQ	2	483	-.55	-.58		.0010	.0000	100	0.89	
9-item OCQ	2	296	-.16	-.19	-.43 to .04	.0182	.0118	35	5.74*	3.81*
Group 4, total	14	3,531	-.23	-.25	-.37 to -.13	.0070	.0033	52	27.10*	
15-item OCQ	4	1,299	-.31	-.33	-.35 to -.31	.0026	.0001	96	4.16	
9-item OCQ	5	1,203	-.18	-.19		.0023	.0000	100	2.90	3.97*
Non-OCQ measures	3	652	-.14	-.16		.0022	.0000	100	1.49	
Side-bet measure	2	377	-.26	-.28		.0001	.0000	100	0.39	4.29*

^a k = the number of samples in each analysis; N = the total number of individuals in the k samples; r = the mean weighted uncorrected correlation; and r_i = the mean weighted correlation corrected for attenuation. The confidence interval is 95 percent for r_i; the observed variance is the variance of the uncorrected correlations, and the residual variance is the latter corrected for statistical artifacts.

^b Group 1: six months or less in turnover measurement, and 30 years or less in age or 2 years or less in tenure; Group 2: more than six months in turnover measurement, and 30 years or less in age or 2 years or less in tenure; Group 3: six months or less in turnover measurement, and more than 30 years in age or 2 years in tenure; Group 4: more than six months in turnover measurement and more than 30 years in age or 2 years in tenure.

* p < .05

** p < .01

*** p < .001

3, 9-item OCQ), results of the chi-square test were not significant when commitment measures were controlled.

When age is the career indicator, regression results strongly support the interaction effect and confirm the results of the hierarchical meta-analysis (Table 5, model 4). The interaction effect is significant when career stage is defined as a dummy variable and as chronological age. Organizational commitment measures strongly affected the correlations. The measures explained 56 percent of the variance, indicating a strong effect. However, the age-time interaction contributed additionally and significantly to the explained variance, raising it to 70 percent. The interaction effect expected in Hypothesis 2 is not supported when tenure is the career indicator. Another difference is that in the regression equation for age, the time to turnover measurement has a significant effect when entered (model 2), but in the equation for tenure, tenure as career indicator has a significant effect (model 3), and the time to turnover measurement does not. It should be noted that when tenure was analyzed as chronological, the final equation (model 4) revealed a significant, positive effect of time to turnover that replaced the significant effect of tenure in model 3. This is the only difference found between the analysis of age and tenure as dummy rather than chronological variables.

DISCUSSION

The purpose of this study was to examine how the time elapsed between measurement of the variables can moderate the organizational commitment–turnover relationship. The main hypothesis, predicting that time span would have a differing effect across career stages, was supported when age served as the career stage indicator but was not when tenure did. Results of the regression analysis generally supported the meta-analytic findings while explaining considerable variance in the commitment–turnover correlations. The main conclusion that can be drawn is that both methodological and theoretical moderators strongly affect that relationship. Future research should therefore focus on examining these moderators before any conclusion can be reached regarding the value of organizational commitment as an attitude and as a research topic. In that regard, this study proposes a potential future research agenda.

Age and Tenure as Career Stage Indicators

The findings supported the research hypotheses when age was the career indicator. For younger employees, a prediction problem arises mainly because employees who report high levels of commitment may have a sharp decline shortly after a survey; this results in turnover and prediction errors that can cause a low organizational commitment–turnover relationship. Since changes in commitment occur quite often among new employees, one way to increase the accuracy of the prediction at the early stage is to measure the attitude frequently, for instance, at two-month intervals. For older em-

TABLE 5
Results of Regression Analyses^{a,b}

Variables	Model 1		Model 2		Model 3		Model 4	
	β	<i>t</i>	β	<i>t</i>	β	<i>t</i>	β	<i>t</i>
<i>Regression for age</i>								
Commitment measures								
9-item OCQ	-.79 ^f	-5.02***	-.81	-5.57***	-.75	-4.87***	-.72	-5.13***
Non-OCQ measures	-.59	-3.81***	-.51	-3.51**	-.45	2.85*	-.49	-3.38*
Side-bet measure	-.26	-1.69	-.19	-1.35	-.14	0.94	-.17	-1.24
Interval to turnover measurement ^c			.29	2.10*	.22	1.37	-.28	-1.04
Age ^d					.17	0.98	-.00	-0.02
Interval $\times$ age							.65	2.19*
R ² , dichotomous								
age (adjusted R ²) ^e	.63 (.56)		.70 (.63)		.72 (.63)		.79 (.70)	
R ² , continuous								
age (adjusted R ²)	.63 (.56)		.70 (.63)		.74 (.66)		.81 (.74)	
F, dichotomous age	10.06**		10.08***		8.21***		9.26***	
F, continuous age	10.06**		10.08***		9.15***		10.85***	
ΔR^2 , dichotomous age			.07		.02		.07	
ΔR^2 , continuous age			.07		.04		.07	
F for ΔR^2 , dichotomous age			4.41*		.92		4.78*	
F for ΔR^2 , continuous age			4.41*		2.31		5.75*	
<i>Regression for tenure</i>								
Commitment measures								
9-item OCQ	-.61 ^f	-3.36**	-.81	-3.37**	-.70	-4.27***	-.69	-4.18***
Non-OCQ measures	-.47	-2.64*	-.41	-2.27*	-.53	3.16**	-.51	-2.93**
Side-bet measure	-.16	-0.92	-.11	-0.64	-.22	-1.32	-.19	-1.15
Interval to turnover measurement ^c			.22	1.24	.26	1.68	.38	1.87
Tenure ^d					-.40	2.49*	-.29	-1.40
Interval $\times$ tenure							-.21	-0.89
R ² , dichotomous								
tenure (adjusted R ²) ^e	.40 (.31)		.45 (.33)		.58 (.47)		.60 (.47)	
R ² , continuous								
tenure (adjusted R ²)	.40 (.31)		.45 (.33)		.57 (.45)		.62 (.49)	
F, dichotomous tenure	4.72*		4.02*		5.30**		4.51*	
F, continuous tenure	4.72*		4.02*		4.94**		4.91**	
ΔR^2 , dichotomous tenure			.05		.13		.02	
ΔR^2 , continuous tenure			.05		.12		.05	
F for ΔR^2 , dichotomous tenure			1.55		6.22*		.80	
F for ΔR^2 , continuous tenure			1.55		5.22*		2.64	

^a N = 22 for equations for age; N = 25 for equations for tenure.

^b The negative signs of the commitment-turnover correlations were omitted.

^c 0 = more than six months, 1 = six months or less.

^d 0 = more than 30 years for age and 2 years for tenure, 1 = 30 years or less for age and 2 years or less for tenure.

^e Results are based on listwise deletion of missing values.

^f The standardized regression coefficients are presented only for the analysis of age and tenure as dichotomous variables. The coefficients for the analysis of age and tenure as continuous are available from author.

* $p < .05$

** $p < .01$

*** $p < .001$

employees, errors in prediction occur more because employees report low levels of organizational commitment but may not leave their organization because of structural bonds, few employment alternatives, and a desire for stability. For such employees, predictions may be more accurate the longer the time interval between the measurement of the two variables, because it will cover the slow process from the decline of their organizational commitment to their departure decision and the longer time they need to seek and find alternative employment. Therefore, although for new employees frequent measurement of organizational commitment should increase the accuracy of prediction, for employees in later career stages, frequent collection of turnover data should increase that accuracy.

Results do not support the research hypotheses when tenure is the career indicator. A proposed explanation is that tenure cannot be interpretable in the first years of employment because at this stage the commitment-turnover relationship is largely a reflection of affect triggered by unrealistic and inflated job previews and new employees' need to justify their choice among employment alternatives (Werbel & Gould, 1984). People need experience in an organization to develop a realistic evaluation of their relationship with it. This pattern may explain the lack of difference between the tenure groups in the meta-analysis (Table 2) and the lack of interaction between tenure and time spans in the regression results. The hierarchical moderator analysis, in which time lag has an effect only for employees with more than two years of experience (Table 4, group 3), also supports this explanation. In addition, the fact that the regression equation for tenure reveals a significant effect of time to organizational departure (Table 5, model 4) only when tenure is analyzed as a continuous variable suggests that tenure is better represented as such rather than as a dichotomous variable.

The findings of this research support previous findings and arguments that age and tenure as career stage indicators represent different processes (Bedeian et al. 1992; Cohen, 1991; Morrow & McElroy, 1987; Werbel & Gould, 1984). Bedeian and colleagues (1992) argued that age and tenure are theoretically interesting variables whose relation to outcomes of interest and importance has been neglected. They suggested that theoretical and methodological advances concerning these two variables should prove fruitful scientifically and practically. More work is required, however, before more definite conclusions can be reached regarding the effects of age and tenure.

Some Methodological Implications

Several methodological implications of this research are worth noting. First, the effect of the type of measure of organizational commitment used is very strong. Such a strong effect did not emerge in previous meta-analyses (Mathieu & Zajac, 1990; Randall, 1990), probably because they did not control for the two different versions of the OCQ, as did this study. It is apparent that turnover's relationship with the full version of the OCQ is stronger than

that with the shorter instrument, because the first measure includes items that refer to turnover. However, the problem is not whether the full or the short version of the OCQ should be applied. There is a need for a theoretical and conceptual reexamination of the definition and theory behind the measures of organizational commitment. Only after such a reexamination could a conclusion be reached as to whether the OCQ is the appropriate instrument for measuring this attitude and which of its versions, if any, should be applied in future research. At present, research regarding the focal relationship cannot be interpreted or conducted without considering the effect of the measurement of commitment upon findings.

Second, the findings of this study showed the value of hierarchical moderator analysis, which has been used very rarely in the literature. Williams (1990: 736) argued that "hierarchical moderator analysis can provide a much richer means of understanding why turnover results vary from study to study." This study shows how theory-based systematic breakdowns of moderators can detect the conditions that affect the commitment-turnover relationship. Third, the study also shows the value of using various methods of study aggregation for testing the same hypothesis. Meta-analysis is a much more sensitive procedure than regression analysis because it can uncover and illustrate the unique impact of each moderator upon a relationship. This sensitivity was demonstrated in particular in the stronger relationship found for group 3, representing samples in which the measurement interval was six months or less and individuals had more than two years in tenure, which cannot be captured in regression analysis. The regression analysis can tell more about the relative importance of each of the moderators; the importance of the organizational commitment measurement was shown in this study, for instance. Regression analysis, despite its limitations (Hunter & Schmidt, 1990) can supplement meta-analytic findings.

Finally, several limitations of the study should be mentioned. First, the results of the hierarchical moderator analysis are based on parts of the total sample, 22 and 25 out of 36 samples, because of missing values, especially for the career stage variables. Hunter and Schmidt (1990) argued that if the number of studies in the cells of a full hierarchical analysis is small, firmer conclusions must await the accumulation of more studies. Second, organizational commitment is not the only predictor of turnover. Mediators such as withdrawal cognition, or intention to leave an organization, and perceived alternative employment (Mowday, Koberg, & McArthur, 1984) that were not included in this study also affect the commitment-turnover relationship. However, the findings of this study show that organizational commitment and turnover are both dynamic concepts. Examining them by static linear statistical manipulations at two points of time cannot give an accurate estimation of their relationship. More empirical research is needed to validate the results and conclusions of this study. Longitudinal research designs that will measure the focal variables at more than one point of time are essential for clarifying their relationship. Some of the arguments and findings of this study may well be a good starting point for such research.

REFERENCES

- Abelson, M. A. 1983. The impact of goal change on prominent perceptions and behaviors of employees. *Journal of Management*, 9: 65-79.
- Arnold, H. J., & Feldman, C. C. 1982. A multivariate analysis of the determinants of job turnover. *Journal of Applied Psychology*, 67: 350-360.
- Becker, H. S. 1969. Notes on the concept of commitment. *American Journal of Sociology*, 32: 341-347.
- Bedeian, A. G., Ferris, G. R., & Kacmar, K. M. 1992. Age, tenure, and job satisfaction: A tale of two perspectives. *Journal of Vocational Behavior*, 40: 33-48.
- Blau, G. J. 1989. Testing the generalizability of a career commitment measure and its impact on employee turnover. *Journal of Vocational Behavior*, 35: 88-103.
- Blau, G. J., & Boal, K. B. 1987. Conceptualizing how job involvement and organizational commitment affect turnover and absenteeism. *Academy of Management Review*, 12: 288-300.
- Blegen, M. A., Mueller, C. W., & Price, J. L. 1988. Measurement of kinship responsibility for organizational research. *Journal of Applied Psychology*, 73: 402-409.
- Clegg, C. W. 1983. Psychology of employee lateness, absence and turnover: A methodological critique and an empirical study. *Journal of Applied Psychology*, 68: 88-101.
- Cohen, A. 1991. Career stage as a moderator of the relationships between organizational commitment and its outcomes: A meta-analysis. *Journal of Occupational Psychology*, 64: 253-268.
- Colarelli, S. M., Dean, R. A., & Konstans, C. 1987. Comparative effects of personal and situational influences on job outcomes of new professionals. *Journal of Applied Psychology*, 72: 558-566.
- Decotilis, T. A., & Summers, T. P. 1987. A path analysis of a model of the antecedents and consequences of organizational commitment. *Human Relations*, 40: 445-470.
- Ferris, K. R., & Aranya, N. 1983. A comparison of two organizational commitment scales. *Personnel Psychology*, 36: 87-98.
- Fisher, C. D. 1985. Social support and adjustment to work: A longitudinal study. *Journal of Management*, 11(3): 39-53.
- Gould, S., & Hawkins, B. 1978. Organizational career stage as a moderator of the satisfaction-performance relationship. *Academy of Management Journal*, 21: 434-450.
- Hollenbeck, J. R. 1989. Control theory and the perception of work environments: The effects of focus of attention on affective and behavioral reactions to work. *Organizational Behavior and Human Decision Processes*, 43: 406-430.
- Hollenbeck, J. R., & Williams, C. R. 1986. Turnover functionally versus turnover frequency: A note on work attitudes and organizational effectiveness. *Journal of Applied Psychology*, 71: 606-611.
- Hom, P. W., & Hulin, C. L. 1981. A competitive test of the prediction of re-enlistment by several models. *Journal of Applied Psychology*, 66: 23-39.
- Hom, P. W., Katerberg, R., & Hulin, C. L. 1979. Comparative examination of three approaches to the prediction of turnover. *Journal of Applied Psychology*, 64: 280-290.
- Hunter, J. E., & Schmidt, F. L. 1990. *Methods of meta-analysis: Correcting error and bias in research findings*. Beverly Hills, CA: Sage.
- Husfield, M. A., & Day, N. E. 1991. Organizational commitment, job involvement, and turnover: A substantive and methodological analysis. *Journal of Applied Psychology*, 76: 380-391.

- Kemery, E. R., Dunlap, W. P., & Griffeth, R. W. 1988. Correction for variance restriction in point-biserial correlations. *Journal of Applied Psychology*, 73: 888-891.
- Kinicki, A. J., Hom, P. W., Lockwood, C. A., & Griffeth, R. W. 1990. Interviewer predictions of applicant qualifications and interviewer validity: Aggregate and individual analyses. *Journal of Applied Psychology*, 75: 477-486.
- Lee, T. W., & Mowday, R. T. 1987. Voluntarily leaving an organization: An empirical investigation of Steers and Mowday's model of turnover. *Academy of Management Journal*, 30: 721-743.
- Levinson, D. J., Darrow, C. N., Klein, E. B., Levinson, M. H., & McKee, B. 1978. *The seasons of a man's life*. New York: Knopf.
- Marsh, R. M., & Mannari, H. 1977. Organizational commitment and turnover: A prediction study. *Administrative Science Quarterly*, 22: 57-75.
- Mathieu, J. E., & Zajac, D. M. 1990. A review and meta-analysis of the antecedents, correlates and consequences of organizational commitment. *Psychological Bulletin*, 108: 171-194.
- Mayes, B. T., & Ganster, D. C. 1988. Exit and voice: A test of hypotheses based on fight/flight responses to job stress. *Journal of Organizational Behavior*, 9: 199-216.
- Michaels, C. E., & Spector, P. E. 1982. Causes of employee turnover: A test of the Mobley, Griffeth, Hand & Meglino model. *Journal of Applied Psychology*, 67: 53-59.
- Miller, L. E., Powell, G. N., & Seltzer, J. 1990. Determinants of turnover among volunteers. *Human Relations*, 43: 901-917.
- Mobley, W. H., Griffeth, R. H., Hand, H. H., & Meglino, B. M. 1979. Review and conceptual analysis of the employee turnover process. *Psychological Bulletin*, 86: 493-522.
- Morrow, P. C., & McElroy, J. C. 1987. Work commitment and job satisfaction over three career stages. *Journal of Vocational Behavior*, 30: 330-346.
- Mowday, R. T., Koberg, C. S., & McArthur, A. W. 1984. The psychology of the withdrawal process: A cross-validated test of Mobley's intermediate linkages model of turnover in two samples. *Academy of Management Journal*, 27: 79-94.
- Mowday, R. T., Porter, L. M., & Steers, R. M. 1982. *Employee-organizational linkage*. New York: Academic.
- Mowday, R. T., Steers, R. M., & Porter, L. M. 1979. The measurement of organizational commitment. *Journal of Vocational Behavior*, 14: 224-247.
- O'Reilly, C. A., III, & Caldwell, D. 1981. The commitment and job tenure of new employees: A process of post-decisional justification. *Administrative Science Quarterly*, 26: 597-616.
- O'Reilly, C. A., III, & Chatman, J. 1986. Organizational commitment and psychological attachment: The effects of compliance, identification and internalization on prosocial behavior. *Journal of Applied Psychology*, 71: 492-499.
- Parasuraman, S. 1982. Predicting turnover intentions and turnover behavior: A multivariate analysis. *Journal of Vocational Behavior*, 21: 111-121.
- Parasuraman, S., & Alutto, J. A. 1984. Sources and outcomes of stress in organizational settings: Toward the development of a structural model. *Academy of Management Journal*, 27: 330-350.
- Pierce, J. L., & Dunham, R. B. 1987. Organizational commitment: Pre-employment propensity and initial work experiences. *Journal of Management*, 13(1): 163-178.
- Porter, L. W., Crampon, W. J., & Smith, F. J. 1976. Organizational commitment and managerial turnover. *Organizational Behavior and Human Performance*, 15: 87-98.
- Porter, L. W., Steers, R. M., Mowday, R. T., & Boulliar, P. V. 1974. Organizational commitment,

- job satisfaction and turnover among psychiatric technicians. *Journal of Applied Psychology*, 59: 603-609.
- Price, J. L., & Mueller, C. 1981. A casual model of turnover for nurses. *Academy of Management Journal*, 24: 543-565.
- Randall, D. M. 1990. The consequences of organizational commitment: Methodological investigation. *Journal of Organizational Behavior*, 11: 361-378.
- Reichers, A. E. 1985. A review and reconceptualization of organizational commitment. *Academy of Management Review*, 10: 465-476.
- Ritzer, G., & Trice, H. M. 1969. An empirical study of Howard Becker's side-bet theory. *Social Forces*, 47: 475-479.
- Rush, J. C., Peacock, A. C., & Milkovich, G. T. 1980. Career stages: A partial test of Levinson's model of life/career stages. *Journal of Vocational Behavior*, 16: 347-359.
- Slocum, J. W., & Cron, W. L. 1985. Job attitudes and performance during three career stages. *Journal of Vocational Behavior*, 26: 126-145.
- Steel, R. P., Shane, G. S., & Griffeth, R. W. 1990. Correcting turnover statistics for purposes of comparative analysis. *Academy of Management Journal*, 33: 179-187.
- Steers, R. M. 1977. Antecedents and outcomes of organizational commitment. *Administrative Science Quarterly*, 22: 46-56.
- Stumpf, S. A., & Hartman, K. 1984. Individual exploration of organizational commitment or withdrawal. *Academy of Management Journal*, 27: 308-329.
- Stumpf, S. A., & Rabinowitz, S. 1981. Career stage as a moderator of performance relationships with facets of job satisfaction and role perceptions. *Journal of Vocational Behavior*, 18: 202-218.
- Super, D. 1957. *The psychology of careers*. New York: Harper.
- Werbel, J. D., & Gould, S. 1984. A comparison of the relationship of commitment to the turnover in recently hired and tenured employees. *Journal of Applied Psychology*, 69: 687-690.
- Wiener, Y., & Vardi, Y. 1980. Relationships between job, organization and work outcomes: An integrative approach. *Organizational Behavior and Human Performance*, 26: 81-96.
- Williams, C. R. 1990. Deciding when, how, and if to correct turnover correlations. *Journal of Applied Psychology*, 75: 732-737.
- Wunder, R. S., Dougherty, T. W., & Welsh, M. A. 1982. A causal model of role stress and employee turnover. *Academy of Management Proceedings*: 297-301.

Aaron Cohen is an assistant professor in the Department of Political Science, University of Haifa, Israel. He earned his Ph.D. degree at the Technion-Israel Institute of Technology. His current research interests include work commitment and, in particular, organizational commitment and union commitment, turnover, and union participation.

The Best in The Business.

THE RISE AND FALL OF STRATEGIC PLANNING

Henry Mintzberg,
McGill University

In this exhaustively researched, definitive history of strategic planning, Henry Mintzberg argues that since 1965, management's reliance on strategic planning has often narrowed a company's vision with disastrous business consequences. Mintzberg examines every school of strategic planning and comes to the conclusion that no matter the form, shape, or size of the "plan," planners have failed to address the strategists' fundamental dilemmas of reconciling concurrent but conflicting needs for change and stability within the organization. With chapters on the "fundamental fallacies" and "pitfall characteristics" of strategic planning, Mintzberg shows how strategic planning can impede commitment, discourage major change, and promote politics in organizations. Finally, Mintzberg explains a new relationship for planning that will be invaluable for all managers.

1993 0-02-921605-2 \$29.95

BREAKING THE MOLD Women, Men, and Time in the New Corporate World

Lotte Bailyn, *Massachusetts
Institute of Technology*

American workers today are being asked to work harder and longer just when demands on the home front have escalated due to changing family structures. Bailyn argues that unless American business is willing to radically rethink its basic assumptions about career paths, management strategies, and the time clock, both employee and employer will face increasing work force problems in the upcoming century. Drawing on her research and consulting work, Bailyn presents a blueprint for changing the corporate mindset. She shows, for example, the importance and profitability of flexible work days and how the new technology can free the worker, allowing him or her the option of working at home or in the office. Using real life cases, she argues for basic change in which both business and its workers can benefit in the 90s and beyond.

1993 0-02-901281-3 \$22.95

THE COST OF TALENT

**How Executives and Professionals
Are Paid and How It Affects America**
Derek Bok, *Harvard University*

The continuing uproar over top executive pay packages in American companies calls attention to an even larger and more important issue: in general, do we compensate highly educated people in the United States in ways that serve the best interests of the nation? In the most revealing study yet undertaken of compensation practices in the fields of business, law, medicine, higher education, teaching, and government, Bok argues that the compensation paid to top executives, lawyers, and doctors cannot be justified, nor is there evidence that huge bonuses and other financial incentives motivate them to do better work. As we enter a new period of national development, Bok concludes that we must rethink our deepest values, motivations, and priorities reflected in our compensation practices in order to better serve America's long-term interests.

1993 0-02-903753-7 \$24.95

BUSINESS SENSE

**Exercising Management's
Five Freedoms**

Dan Thomas,
Founder and President, FOCUS

"This is not a coffee table book. It's loaded with practical advice about how to build and maintain a successful business. Dan Thomas' five freedoms will help you meet the most important challenge in today's business environment—change."

—**Lewis E. Platt,** President and CEO,
Hewlett-Packard Company

1993 0-02-932444-0 \$24.95

QUALITY IS PERSONAL

**A Foundation for
Total Quality Management**

Harry V. Roberts,
University of Chicago, and
Bernard F. Sergesketter, *AT&T*

"I recommend the book to any manager who wants to do more to get at the heart of quality performance—and personal effectiveness."

—**Richard L. Thomas,** Chairman, President
and CEO, First Chicago

1993 0-02-926625-4 \$19.95 paper
0-02-926626-2 \$29.95 cloth

MANAGING WITH DUAL STRATEGIES

Mastering the Present,
Preempting the Future

Derek F. Abell,

*International Institute for Management
Development, Switzerland*

"Must reading for business educators, senior managers, and corporate directors. Derek Abell presents a new and pragmatic approach to a perennial management dilemma—how to implement one's current organizational strategy while simultaneously managing the emergence of a new strategy to meet future competitive needs."

—C. Roland Christensen, Harvard University

1993 0-02-900145-5 \$29.95

STRATEGIC COST MANAGEMENT

The New Tool for
Competitive Advantage

John K. Shank and

Vijay Govindarajan, both
Dartmouth College

"This book—by insisting that management accounting must consider strategic issues and showing how to do so—provides a sophisticated understanding of cost structures, which is essential to achieving a sustainable competitive advantage."

—Barry J. Brinker, Editor,
Journal of Cost Management

1993 0-02-912651-7 \$29.95

FAST CYCLE TIME

How to Align Purpose, Strategy,
and Structure for Speed

Christopher Meyer,

Strategic Alignment Group

Foreword by **Peter M. Senge**

"Thanks to Chris Meyer's ideas, principles, and especially his methods, Quantum Corporation transformed from a company that was late to market to one that is now first to market with excellent products. This book provides a crisp implementation strategy, grounded in substance and experience."

—David A. Brown, Founder & Board Member,
Quantum Corporation

1993 0-02-921181-6 \$29.95

THE CORPORATE CLOSET

The Professional Lives of
Gay Men in America

James D. Woods with

Jay H. Lucas

While most of us believe that professional conduct is, or should be, asexual, corporate America is, in fact, suffused with sexual assumptions. For thousands of gay professionals, this "sexual culture" forces a series of difficult choices. Drawing on hundreds of interviews, Woods explores the professional lives of gay men, and the various strategies they have developed for managing sexual identity at work. Woods' fascinating inquiry explores the dynamics of sexuality in professional life, and the way it shapes our own self-definitions, values, and most deeply-held ideas about work.

1993 0-02-935603-2 \$22.95

Now available in paperback—

ON LEADERSHIP

With a New Preface

John W. Gardner

1993 0-02-911312-1 \$16.95 paper

NEGOTIATING RATIONALLY

Max H. Bazerman and

Margaret A. Neale

1993 0-02-901986-9 \$14.95 paper

MANAGING BUSINESS TRANSACTIONS

Controlling the Cost of
Coordinating, Communicating,
and Decision Making

Paul H. Rubin

1993 0-02-927596-2 \$19.95 paper

GENERATIONAL ACCOUNTING

Knowing Who Pays, and
When, For What We Spend

Laurence J. Kotlikoff

1993 0-02-917585-2 \$12.95 paper

For credit card
orders, call toll-free
1-800-323-7443.



THE FREE PRESS

A Division of Macmillan, Inc./A Maxwell Macmillan Company
866 Third Avenue, New York, NY 10022

NEW FROM LEXINGTON BOOKS

THE DIVERSITY ADVANTAGE

*How American Business
Can Outperform Japanese and
European Companies in the
Global Marketplace*

John P. Fernandez with Mary Barr

“John Fernandez demonstrates once again why he's ahead of the curve with his persuasive rationale for diversity in the American workplace. *The Diversity Advantage* is a realistic assessment of how a domestic business can both enhance its bottom line and meet its social commitments.”

—**David J. Arrington**,
Senior Vice President, Human Resources,
Niagara Mohawk Power Corporation

1993 0-669-27978-1 \$24.95

THE PUBLIC RELATIONS WRITER'S HANDBOOK

Merry Aronson and Don Spetner

“If you want to seize the competitive edge in PR writing, this handbook is an investment with a fast payback. It is filled with exciting ideas and tips—a valuable handbook that will sharpen both your thinking and your writing.”

—**Brent Baker**,
Dean, College of Communication, Boston
University; and Rear Admiral, Chief of Naval
Information, U.S. Navy (Retired)

1993 0-02-901052-7 \$19.95

THE SAVE YOUR BUSINESS BOOK

*A Survival Manual for
Small Business Owners*

John Goldhammer

“The *Save Your Business Book* shows you how to get your business back on track if you are having problems. If you are not having problems, this book offers practical suggestions to help strengthen your organization. Either way, you will gain insight on how to create a better business for your customers, employees, and environment.”

—**Sandy Gooch**, Founder and co-owner of
Mrs. Gooch's Natural Food Markets

1993 0-02-912115-9 \$22.95

THE HANDBOOK FOR FOCUS GROUP RESEARCH

Revised and Expanded Edition

Thomas L. Greenbaum

“The depth of knowledge of focus groups reflected in this book is not only truly astounding but is clearly articulated. I cannot imagine a reader not finding herein new thoughts about focus groups or, more important, ideas of specific applications for the reader's business.”

—**Roy Bostock**, Chairman and CEO,
DMB&B, Inc., from the Foreword

1993 0-669-27799-1 \$24.95

**For Visa, MasterCard, Discover, or American Express orders,
call toll-free 1-800-323-7445.**



LEXINGTON BOOKS

PUBLISHING FOR PROFESSIONALS

An Imprint of Macmillan, Inc./A Maxwell Macmillan Company
866 Third Avenue, New York, NY 10022

**Whether you're looking
for the latest on TQM or
the most popular text
for HRM or POM...
...look no further
than your West REP.**

**IN QUANTITATIVE
COURSES FOR 1994**

Black

Business Statistics:
Contemporary Decision Making

Anderson, Sweeney, and Williams

An Introduction to Management
Science, Seventh Edition

IN MANAGEMENT FOR 1994

Costley, Santana-Melgoza, Todd

Human Relations In Organizations
Fifth Edition

Dean and Evans

Total Quality: Management,
Organization, and Strategy

Evans

Fundamentals of Quality Management

Fandt

Management Skills: Learning through
Practice and Experience

Harrison and St. John

Strategic Management of
Organizations and Stakeholders
*A three-book series with the
option to customize.*

Marcic and Puffer

International Management:
Cases and Exercises

Mathis and Jackson

Human Resource Management
Seventh Edition

Nelson and Quick

Organizational Behavior: Foundations,
Realities, and Challenges

Wetherbe and Vitalari

Systems Analysis and Design
Fourth Edition
Case Book also available

Wu and Wu

Systems Analysis and Design
Project/Case Book also available

IN MARKETING FOR 1994

Coyle, Bardi, and Novack

Transportation, Fourth Edition

**Also ask about our 1993 titles in the
above areas, plus ethics, small business
management and entrepreneurship, MIS,
organization development, supervision,
and communications. © West Publishing.**

WEST PUBLISHING CORPORATION

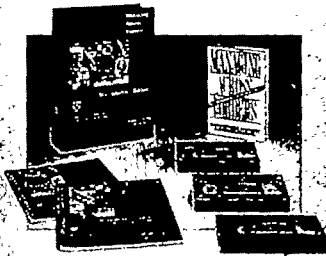
**College Division, D4-13 • 620 Opperman Drive
P.O. Box 64770 • St. Paul, Minnesota 55164-0779**

DOES YOUR COMPANY HAVE THE SKILLS TO THRIVE IN THE GLOBAL ARENA? TRY THIS SIMPLE TEST.

Is your firm able to: (1) achieve global efficiencies of scale? (2) respond quickly to local and national differences? (3) transfer innovation rapidly around the world?

These are the critical corporate capabilities that are already distinguishing winners in the global marketplace. And *Managing Across Borders*, a new, self-administered video seminar from Harvard Business School, will help you and your top executives chart a course for developing all three in your organization.

Managing Across Borders will immerse your management team in a fast-paced program of focused discussion and analysis, centered around video interviews



with senior managers and video presentations by Christopher Bartlett (Harvard Business School) and Sumantra Ghoshal (INSEAD). You'll define the vision, the values, and the culture required to nurture the three critical corporate skills within your company and actually take the first steps toward making them reality.

Send for an introductory information kit. A *Managing Across Borders* introduction kit is available for just \$25 (applicable toward purchase of the full program). The kit includes a video overview of the seminar and a detailed outline of the program contents. To get your information kit, simply call 800-248-1878 ext. 7517, or complete the information below and fax this page to 617-496-8866.

To order from outside the U.S. and Canada, call 617-496-5900 ext. 7517 or fax this page to 617-496-8866. To order by mail send to: Harvard Business School Management Programs, Mail Box 230-5, Soldiers Field, Boston MA 02163.

Name: _____ Title: _____
 Company: _____
 Address (no P.O. box): _____
 City: _____ State/Province: _____
 Country: _____ Postal Code: _____
 Telephone: () _____ PO # (US companies only): _____
 Credit Card #: _____ Expiration Date: _____
☐ American Express ☐ MasterCard ☐ VISA Signature: _____



HARVARD BUSINESS SCHOOL
MANAGEMENT PROGRAMS

OXFORD'S WORLD of BUSINESS BOOKS

Small Firms in Global Competition

TAMIR AGMON and RICHARD L. DROBNICK, both at University of Southern California, School of Business Administration
 "At last something for small businesses in the international arena! This book fills a void. Small firms are too often overlooked by management scholars who tend to study multinationals when analyzing competitiveness in a global marketplace. But many small firms can also compete globally if they have the right management tools. *Small Firms in Global Competition* provides these tools."—James W. Castle, Partner, Business Advisory Indonesia; President, American Chamber of Commerce in Indonesia.

(A Research Book from the International Business Education and Research Program, University of Southern California)

1993 192 pp.; illus. \$35.00

Organizational Change and Redesign Ideas and Insights for Improving Managerial Performance

Edited by GEORGE P. HUBER and WILLIAM H. GLICK, both of the University of Texas, Austin

"This book takes the topic of organizational change to a new plateau; and, with the wealth of empirical data and conceptual insights offered, the new view is expansive and enlightening. With cutting-edge contributions by some of the leading thinkers on strategic change, the Huber and Glick volume will be exceedingly valuable for executives and management scholars alike."
 —Donald C. Hambrick, Columbia University.

1993 464 pp.; illus. \$39.95

The Nature of Project Leadership

SVEIN ARNE JESSEN, Institute for Project Management, Sandvika, Norway

In this book a thorough analysis of methods of the modern project concept has been developed, followed by a discussion of possible practical implications.

(A Scandinavian University Press Publication)

1993 248 pp. \$39.95

CULTURE, SELF-IDENTITY, AND WORK

Culture, Self-Identity, and Work

MIRIAM EREZ, Technion—Israel Institute of Technology, and P. CHRISTOPHER EARLEY, University of California, Irvine

"The authors' 'cultural self representation model' provides an illuminating and provocative way of

examining and understanding the work behavior of individuals across different cultural contexts. Their approach is rich with implications for both current managerial practice and future research."—Lyman W. Porter, University of California, Irvine.

1993 280 pp.; illus. \$35.00

National Innovation Systems A Comparative Analysis

Edited by RICHARD R. NELSON, Columbia University

"This book is a classic which will raise the discussion of comparative technology and innovation policies to a new level of sophistication in both description and understanding. It provides an indispensable conceptual framework for future debates over policies and strategies to enhance U.S. economic performance."—Harvey Brooks, Harvard University.

1993 560 pp.; illus. paper \$29.95 cloth \$49.95

Strategic Industrial Sourcing

The Japanese Advantage

TOSHIHIRO NISHIGUCHI, University of Pennsylvania

"The coordination of the supply chain has always been the secret weapon of the best Japanese firms. In this remarkable volume Professor Nishiguchi finally explains how they do it. Any Western manager who fails to read, indeed to study this volume, is passing up an extraordinary opportunity to improve industrial performance."

—James P. Womack, Coauthor of *The Machine that Changed the World*.

1993 384 pp.; illus. \$39.95

STRATEGIC INDUSTRIAL SOURCING

THE JAPANESE ADVANTAGE

TOSHIHIRO NISHIGUCHI

Prices are subject to change and apply only in the U.S. For order information please call 1-800-451-7556.

Oxford University Press

Change of Address?

All publications and other mailings are sent to the address you have filed with the Secretary-Treasurer at the central office. Therefore, you can change everything with one notification, including divisional mailings. Send your change of address and telephone numbers to:

Academy of Management
Ohio Northern University
P.O. Box 209, 300 South Union
Ada, Ohio 45810-0209

Be sure to notify them. Second and third class mail cannot be forwarded—You must have a complete and correct address to ensure delivery of publication.